ATTO Technology, Inc.

ATTO FastStream SC 5700

Installation and Operation Manual

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1.0 ATTO FastStream SC 5700 offers data protection

The ATTO FastStream SC 5700 is an ideal solution for the cost sensitive demands of today's networked storage environments, offering great performance, OS independence, simplified management, and RAID protection for all of your critical data.

Adding RAID ensures your data is protected without compromising performance. The ATTO FastStream SC 5700 is a high performance RAID storage appliance which can be seamlessly integrated into an existing storage environment without regard to any particular manufacturer, type of drive, capacity or speed.

The ATTO FastStream SC 5700 is ideally suited for data intensive applications such as digital video and audio editing. Virtually any high performance computing system with a growing need for storage capacity can use the power of the ATTO FastStream SC 5700.

Although RAID improves data accessibility and reliability during normal operations, you still need a good backup strategy for long-term protection of your data.

The ATTO FastStream SC 5700 is available in an industry standard rack mount 1U enclosure.

FastStream features

- 4 independent 4-Gigabit Fibre Channel interfaces to integrate existing direct attached storage into a high performance SAN environment
- Industry standard rack mount enclosure
- The browser-based GUI, ATTO ExpressNAV™ interface, simplifies configuration, management and navigation
- Field upgradeable firmware with the ability to save configuration settings for easy field replacement
- LUNs can be mapped to one or both host ports, thus increasing availability and security
- Phone Home error notification automatically generates an E-mail alert in the event of a failure
- ECC Protected Memory assures data integrity and continued up time
- Drive initialization and verification identifies attached drives which exhibit poor performance or soft failures
- Capable of measuring performance during normal operation and during the drive initialization process
- OS and platform independent.
- RoHS compliant

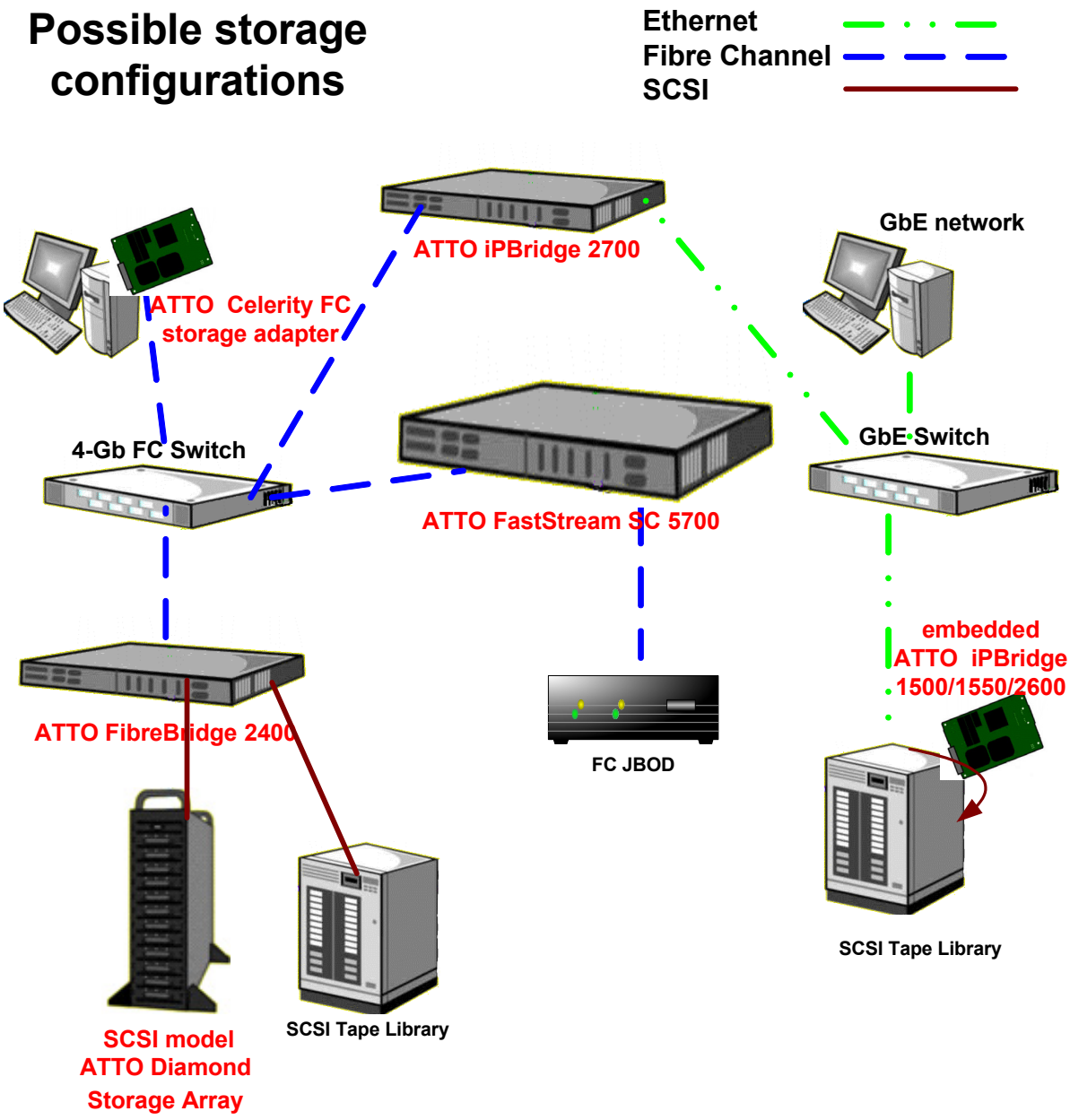
RAID protection features

- Hardware DVRAID, RAID Level 0, RAID Level 1, RAID Level 5, RAID Level 10 and JBOD, all user configurable
- Automatic rebuild of RAID groups and changeable Rebuild Priority keep the system operational if a drive fails
- Global Hot Spares to ensure continuous operation if a drive fails. The Hot Spare automatically comes on-line and rebuild starts if a disk failure is detected

Audio/video features

- Supports 11 streams of SD video and dual streams of HD video
- Supports multiple streams of audio, including editing multiple streams of HD audio

Possible storage configurations



1.1 Physical attributes

The ATTO FastStream SC 5700 is a Fibre Channel to Fibre Channel storage appliance which can be seamlessly integrated into an existing storage environment.

The ATTO FastStream SC 5700 is available in an industry-standard 1U form factor for easy integration into industry-standard racks. It supports next-generation media and is equipped to handle the throughputs needed by advanced disk technologies.

Dimensions

Dimensions

Width: 17 inches
Length: 8.94 inches
Height: 1.7 inches (1U)
Weight: approximately 8 pounds

Cooling and airflow

Operating Temperature: 0°-40° C external
Humidity: 10-90% non-condensing
Airflow: air enters through slots on the right of the rear panel and exits through slots on the left of the rear panel.

CAUTION

Do not block the enclosure's vents. The FastStream SC 5700 does not allow data transfer if overheating occurs.

Power

Input voltage: 100-240VAC, 1.7-.7A, 50-60 Hz

Battery-backed event log: A rechargeable Lithium ion battery cell holds the event log memory for up to 30 days. If the FastStream SC 5700 has been disconnected from power, recharging begins automatically when power is restored to the system. The battery is fully charged after 36 hours of continuous power application.

WARNING

Risk of explosion if battery is removed and/or replaced by an incorrect type. Dispose of used batteries in accordance with your local environmental regulations.

WARNUNG

Explosionsgefahr, wenn die Batterie falsch entfernt und/oder ersetzt wird. Entsorgen Sie benutzte Batterien in Übereinstimmung mit Ihren lokalen Umweltschutzbestimmungen.

Fibre Channel ports

The four independent 4-Gigabit Fibre Channel ports connect the FastStream SC 5700 to either a Fibre Channel Fabric or Fibre Channel Arbitrated Loop using optical SFP connectors and multimode fiber optic cable. Make sure all cables are anchored securely at both ends with the proper connectors. Use the shortest possible cable length for best performance.

Cable length	Cable size
Up to 175 meters	62.5 micron
Up to 500 meters	50 micron

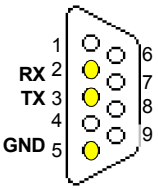
Ports 1 and 2 connect to the host computer; ports 3 and 4 connect to devices (see Exhibit 1.1-1).

Ethernet port

The 10/100 base T Ethernet port is accessible from the RJ45 connector and supports local diagnostics.

Serial port

The RS-232 serial port provides support for remote monitoring and management using a DB9 connector. The baud rate is programmable and preset at the factory to 115200 bps.



Reset/restore factory default switch

To reset the FastStream, briefly insert a tool in the hole in the back panel.

To restore factory defaults, insert the tool in the hole in the back panel for more than four seconds until the green Ready LED blinks.

LED indicators

The LED indicators can be viewed from the back or the front side of the FastStream SC 5700.

LEDs on the connector side (see Exhibit 1.1-1) are:
A bicolor Ready/Fault LED lights green to indicate ready, lights yellow to show a faulted condition, and is off to indicate not ready.

Embedded in the Ethernet port connector: a lighted green LED shows a valid link; off indicates that no link is present. A separate blinking yellow LED indicates activity.

Fibre Channel port: A lighted green LED indicates link; off means no link. A separate green LED indicates activity if it is lit, no activity if it is off.

LEDs on the front (see Exhibit 1.1-2) are:
A green power LED

A bicolor Ready/Fault LED is lighted green to indicate ready, lighted yellow to show a faulted condition, and off indicates not ready.

Fibre Channel ports: bicolor LED indicates FC speed. If it is off, speed is 1-Gb; if it is green, 2-Gb, and yellow indicates 4-Gb FC. A separate green LED indicates activity if it is lit, no activity if it is off.

Exhibit 1.1-1 The connector side of the FastStream SC 5700

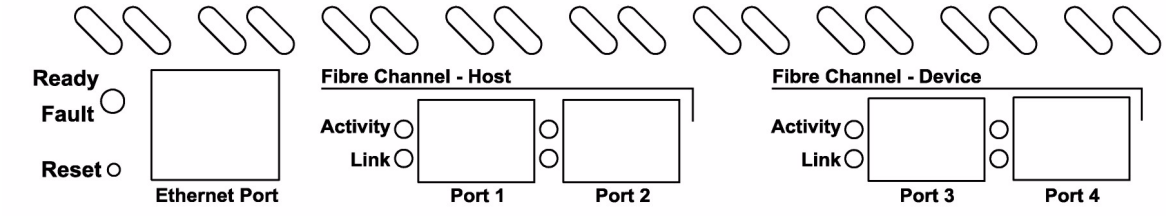
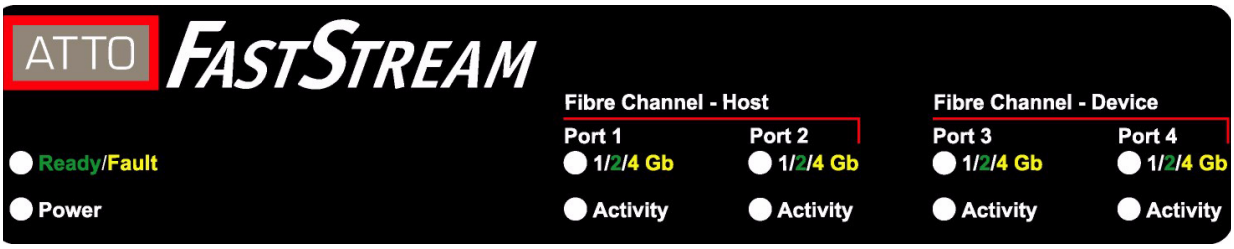


Exhibit 1.1-2 The faceplate of the FastStream SC 5700.



2.0 Installation

If you have not already completed the instructions on the Quick Start page packed with your FastStream SC 5700, use the following instructions to install the FastStream SC 5700.

Unpack the packing box; verify contents

- The FastStream. Note the serial number of your FastStream unit: _____
- Power cord
- "L" brackets for mounting in a 19" rack
- CD which includes the Firmware, Installation and Operation Manual, QuickNAV IP discovery program and system drivers

Install the FastStream

1 Place the FastStream SC 5700 on a stable flat surface or install it into a standard rack. If installing into a rack, see Exhibit 2.0-1.
   a. Attach "L" brackets so that the front side with the LEDs face front and the connector side is at the back.
   b. Install the FastStream horizontally within the rack so it does not reduce the air flow within the rack.
2 Connect the host computer to Fibre Channel port 1 or 2 (see Exhibit 2.0-2).
3 Connect Fibre Channel devices from your SAN to the FastStream ports 3 and 4 (see Exhibit 2.0-2).
4 Add power to the devices.

Note

When connecting to the Fibre Channel ports, use SFPs and multimode fiber optic cables. Keep cable lengths as short as possible to ensure the highest signal quality and performance. Refer to Fibre Channel ports on page 3.

5 Connect the Ethernet port to your network.
6 Connect the AC power cord from the FastStream to the proper AC source outlet.

CAUTION

The power source must be connected to a protective earth ground and comply with local electrical codes. Improper grounding may result in an electrical shock or damage to the unit.

If you are using a rack, the power requirements plus the power draw of the other equipment in the rack must not overload the supply circuit and/or wiring of the rack.

7 Use the power switch to turn on power to the FastStream
8 Wait up to two minutes for the FastStream Ready LED to light indicating the FastStream has completed its power-on self test sequence.
9 Windows® users continue to Install Windows drivers ; Mac® users continue to Discover the IP address

Install Windows drivers

1 Windows automatically detects the FastStream SC 5700 and ask for the driver in the **Add Hardware** wizard. Select **Install from a list or specific location**
2 Click **Next**
3 Choose **Don't Search**
4 Click **Next**
5 Choose **Have disk**
6 Specify the driver as found in the **PC** folder in the setup CD. The files are in a folder based on your operating system: Win2K drivers for Windows 2000 and Windows XP; Win2K3 drivers for all 2003 Server products.

Note

Use the files directly from the CD or copy them onto a floppy or to a local directory on your hard drive.

7 Follow the remaining instructions to complete the installation procedure.
8 After the driver is installed, FastStream is listed in the **System Devices** folder.

Discover the IP address

Note

The FastStream SC 5700 is initially configured with DHCP enabled. It is best if you have access to a DHCP server.

1 Work from the computer attached to the FastStream SC 5700 Ethernet port on the same broadcast domain. From the CD supplied with your FastStream, run the QuickNav Utility **QuickNAV-windows.exe** for Windows or **QuickNAV-Mac** for Mac OS X.
2 Locate the FastStream with the serial number recorded earlier.
3 Highlight the serial number.
4 Click **Next**.

If a DHCP server is available on your network, an address is assigned automatically by the server. Note the assigned address:

_____

If you do not have a DHCP server, get an IP address and subnet mask from your network administrator, type it into the area provided, and select **Next**.

5 Click on **Launch Browser**

6 Click on **Launch Browser**

Your browser points to the ATTO ExpressNAV splash screen. If you use Internet Explorer as a browser, continue on to Internet Explorer setup below. If not, continue on to Begin initial configuration .

Internet Explorer setup

1 Open your browser

2 Select **Internet Options**.

3 In the **Internet Options** screen, select the **Security** tab.

4 Click on the **Trusted Sites** icon.

5 Click on the **Sites** button.

6 In the text box **Add this Web site to the zone**, add the IP address of the appliance. You may use wild cards.

7 Click on **Add**

8 Uncheck the **Require server verification** check box.

9 Click **OK.**

10 At the bottom of the **Internet Options** box, click on **OK** and close the box.

Begin initial configuration

1 The ExpressNAV interface welcome screen appears. Click on **Enter Here**

2 Type in the user name and password.

Note

*The default user name is **root;** it is case insensitive. The default password is **Password**; it is case sensitive. It is best practice to change the passwords. Refer to Optional changes to system configurations on page 15.*

3 The **Initial Setup** page appears.Continue to Configure RAID on page 7

Exhibit 2.0-1 Connecting the FastStream SC 5700 into a rack

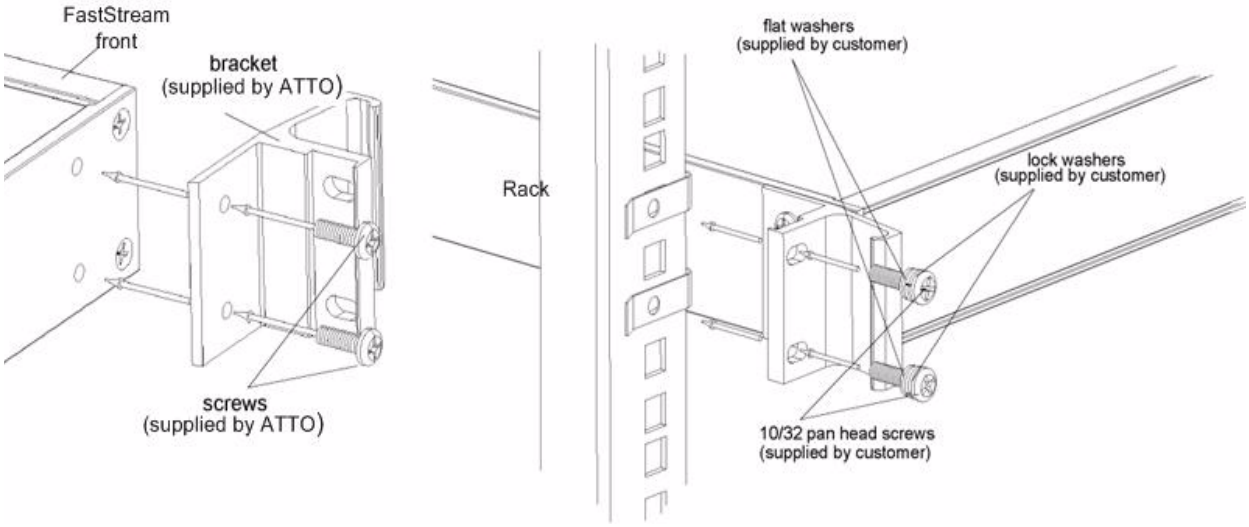
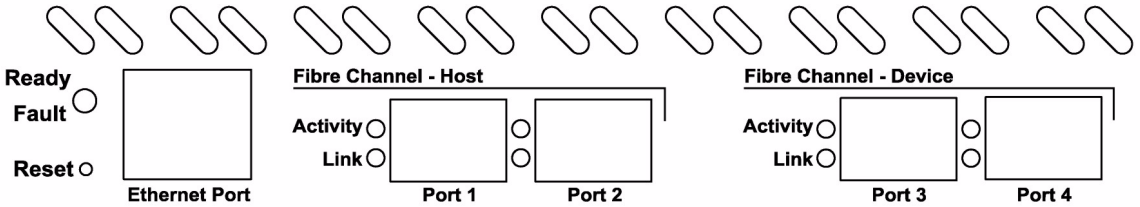


Exhibit 2.0-2 FastStream SC 5700 connections



2.1 Configure RAID

The ATTO FastStream SC 5700 allows configuration of storage into DVRAID, JBOD, RAID Level 0, RAID Level 1, RAID Level 10 or RAID Level 5, all with partitions.

RAID is a storage configuration which uses multiple drives to increase capacity, performance and/or reliability. The FastStream SC 5700 can set up an application-ready RAID configuration automatically, or you may custom design a RAID configuration.

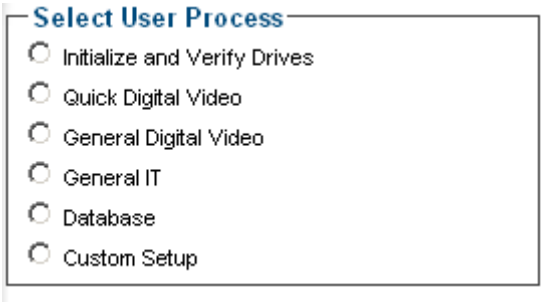
The FastStream SC 5700 uses all available drives when you select **Quick Digital Video, General Digital Video, Audio, General IT** or **Database**. Available drives include those which are on-line and not currently configured for RAID. If you wish to have another type of RAID configuration in the same system, ensure the drives you want in that configuration are offline, then follow the instructions in Modify storage on page 23.

Before creating any RAID group initialize and verify the drives you want in the RAID group.

CAUTION

Clicking on Commit during RAID configuration causes all previous storage data on the drive to be erased. Make sure all of your information is backed up before setting up RAID groups.

RAID improves data accessibility and reliability during normal operations but you still need a good backup strategy for long-term protection of your data.



Initialize and verify drives

Before creating any RAID group you must initialize and verify your drives. When selected, the FastStream SC 5700 writes a pattern to the entire drive.

CAUTION

Selecting Drive Initialization causes all previous storage data on the drive to be erased. Make sure all of your information is backed up before initializing drives.

During initialization and verification, the FastStream SC 5700 collects performance measurements. Although performance data is available once initialization begins, complete setting up your RAID groups before viewing the information from the **Drive Performance and Health** page accessible from the **Diagnostics** menu. This performance data is lost when the appliance is powered off.

1. If you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Use the ExpressNAV interface on page 29, in a standard browser, click **Enter Here** and type in your user name and password.
2. Select **Initialize and Verify Drives**.
3. Click **Next.**
4. Select **Initialize and Verify**
   All eligible drives are highlighted in green; the system only initializes highlighted drives.
5. Click **Commit**.
6. A warning box appears. In the warning box, verify that you want to complete the configuration by clicking on **Yes**. Clicking on **No** ends the procedure without making a change.
7. When the process is complete, the **Health and Status Monitor** page appears.
   The drive(s) selected are now initialized and verified. All data on the highlight drives has been erased and you may continue setting up your FastStream SC 5700.

Select an application

Different RAID configurations provide different levels of security. Refer to Designing RAID groups on page i of the Appendix for a description of each RAID level.

1 If you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Use the ExpressNAV interface on page 29, in a standard browser, click **Enter Here** and type in your user name and password.

2 From the setup menu, select one of the following and continue using the directions in each specific section:

- **Quick Digital Video**: provides parity RAID protection (DVRAID) and optimized performance for digital video (sequential access) configurations using 6, 7, 12, 14 or 24 drives. This set up does not allow you to use any number but 6, 7, 12, 14 or 24.

Note

DVRAID is only available using the Quick Digital Video setup wizard.

- **General Digital Video**: provides parity RAID protection for digital applications (sequential access) for configurations using any number of drives.
- **General IT**: provides parity RAID protection optimized for random access applications using any number of drives.
- **Database:** provides parity RAID protection for database applications (small transfer, random access) for configurations using any number of drives.

Quick Digital Video

Quick Digital Video uses proprietary ATTO Technology DVRAID which allows editing of multiple streams of 10-bit High Definition uncompressed video and multiple streams of Standard Definition video. DVRAID currently supports 6, 7, 12, 14 or 24 drives.

1 If you have chosen **Quick Digital Video,** the **Quick Digital Video Setup Wizard** page appears.
Select your operating system.

2 Select **Next**.

3 Verify you want to continue: click **Yes.**

4 If the system does not find 6, 12 or 24 drives, click on **System Scan** and wait for the scan to complete.

5 Click **Next.**

6 Select a fault tolerance level: click either **Standard Fault Tolerance** (no Hot Spare drives) or **Maximum Fault Tolerance** (which would add Hot Spares to the system). Refer to Use Hot Spares on page 13 for details.

7 Click **Commit.**

8 A warning box appears. In the warning box, verify that you want to complete the configuration by clicking on **Yes**. Clicking on **No** ends the procedure without making a change.

9 The FastStream configures the storage: the process may take several hours. When the process is complete, the **Health and Status Monitor** page appears.

General Digital Video, General IT or Database

1 If you have chosen **General Digital Video, General IT** or **Database**, the **Setup Wizard** page appears.
The FastStream SC 5700 scans your system for drives and configures them into the most appropriate RAID configuration.

2 Select **Commit**.

3 A warning box appears. In the warning box, verify that you want to complete the configuration by clicking on **Yes**. Clicking on **No** ends the procedure without making a change.

4 The FastStream configures the storage: the process may take several hours. When the process is complete, the **Health and Status Monitor** page appears.

Custom initial setup

If the application setups do not suit your needs, you may use Custom Setup to configure the FastStream SC 5700.

1 Follow the directions in Initialize and verify drives on page 7.
2 On the **Initial Setup** page, choose the **Custom Setup** button.
3 Click on **Next**.
4 Select a RAID level. Refer to Designing RAID groups on page i in the Appendix for more information.
5 Type a name for your RAID group in the box provided on the page under the **Step 2** heading.
6 Click **Next.**
7 Click on the **System Scan** button to discover the drives available for RAID configuration.
8 When the scanned drives box is populated, select the drives for the RAID group named in Step 5 of this procedure.
9 Click **Next**.
10 Partition the RAID group as defined in Partition RAID groups on page 11. If you do not want to use partitions, click on the **All Unallocated** box.
11 Click **Create.**
12 **Step 6** appears. Verify the setup, then click on **Commit** to save your configuration.
13 A warning box appears. In the warning box, verify that you want to complete the configuration by clicking on **Yes**. Clicking on **No** ends the procedure without making a change.
14 The FastStream configures the storage: the process may take several hours. When the process is complete, the **Health and Status Monitor** page appears.

2.2 Partition RAID groups

A RAID group may have several Terabytes of total data capacity because of the size of the included drives. Partitions allow you to break up large RAID groups into smaller, more manageable groups without using individual lower capacity RAID groups.

Most host systems can only address 2 TB per LUN. Partitioning increases storage efficiency by providing more LUNs without using lower capacity RAID groups. Partitioning allows the creation of multiple logical volumes. Use the ExpressNAV interface and follow its directions to divide the default one partition into subpartitions.

Create partitions during initial setup

When you initially create RAID groups or add RAID groups, you may partition large RAID volumes into smaller, more manageable sizes.

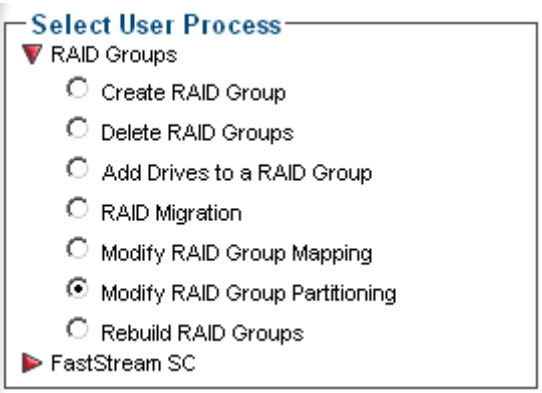
1. If you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Use the ExpressNAV interface on page 29, in a standard browser, click **Enter Here** and type in your user name and password.
2. Initialize and verify your drives as found in Initialize and verify drives on page 7
3. On the **Initial Setup** page, choose the **Custom Setup** button.
4. Click on **Next**.
5. Select a RAID level. Refer to Designing RAID groups on page i in the Appendix for more information.
6. Type a name for your RAID group in the box provided on the page under the **Step 2** heading.
7. Click **Next.**
8. Click on the **System Scan** button to discover the drives available for RAID configuration.
9. When the scanned drives box is populated, select the drives for the RAID group named in Step 6 of this procedure.
10. Click **Next**.
11. Partition the RAID group using the drop down boxes and text boxes. If you do not want to use partitions, click on the **All Unallocated** box.
12. Click **Create.**
13. **Step 6** appears. Verify the setup, then click on **Commit** to save your configuration.
14. A warning box appears. In the warning box, verify that you want to complete the setup by clicking on **Yes**. Clicking on **No** ends the procedure without making a change. If you wish to completely end this setup, click on **Cancel** on the **RAID Setup Wizard** page.

Modify partitions after initial setup

CAUTION

Modifying partitions may cause loss of existing data.

1. If you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Use the ExpressNAV interface on page 29, in a standard browser, click **Enter Here** and type in your user name and password.
2. Click on the **Manage** button.
3. Click on the **RAID Groups** arrow
4. Click on the **Modify RAID Group Partitioning** button

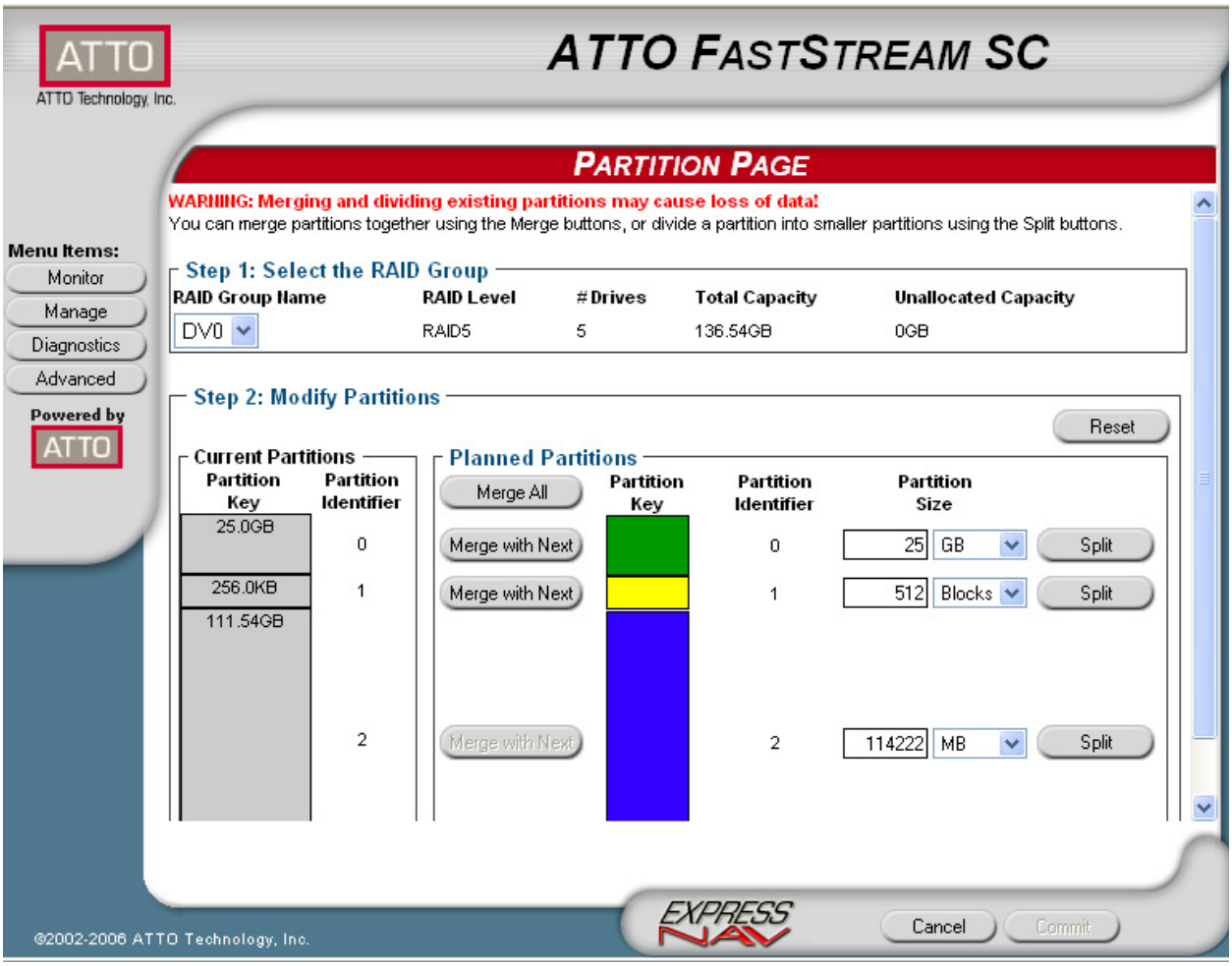


5. Click **Next**
6. Select the **RAID Group Name** from the drop down menu
7. Using the graphic and drop down boxes, choose to either merge or split existing partitions or assign different values for the partition sizes.
8. Click **Commit**

9 A warning box appears. In the warning box, verify that you want to complete the configuration by clicking on **Yes**. Clicking on **No** ends the procedure without making a change.

10 When the process is complete, the **Health and Status Monitor** page appears.

Exhibit 2.2-1 The Partition page wizard takes you through the partitioning process.



2.3 Use Hot Spares

If a member of a virtual device becomes degraded or faulted, you lose some redundancy in your RAID group until a new member is rebuilt into the RAID group. However, Hot Spare devices may be designated as replacements for faulted devices without intervention by you or a host.

The ATTO FastStream SC 5700 replaces degraded or faulted virtual devices in RAID groups without intervention by you or a host. You may set up a pool of Hot Spare devices of different sizes appropriate for your RAID groups.

Hot Spares may be set up by the FastStream SC 5700 automatically depending on your choices during initial setup.

Note

Block devices in the Hot Spare pool should be of appropriate size to the RAID group so that smaller block devices are not replaced by much larger Hot Spare devices.

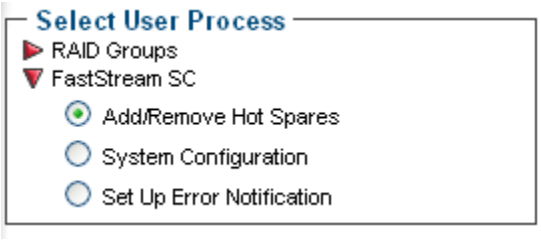
When the ATTO FastStream SC 5300 detects a faulted device:

- The Controller searches the Hot Spare pool for the smallest block device of sufficient size to substitute for the faulted drive.
- The FastStream replaces the faulted device with the device from the Hot Spare pool.
- The FastStream begins an automatic rebuild of the RAID groups.

Note

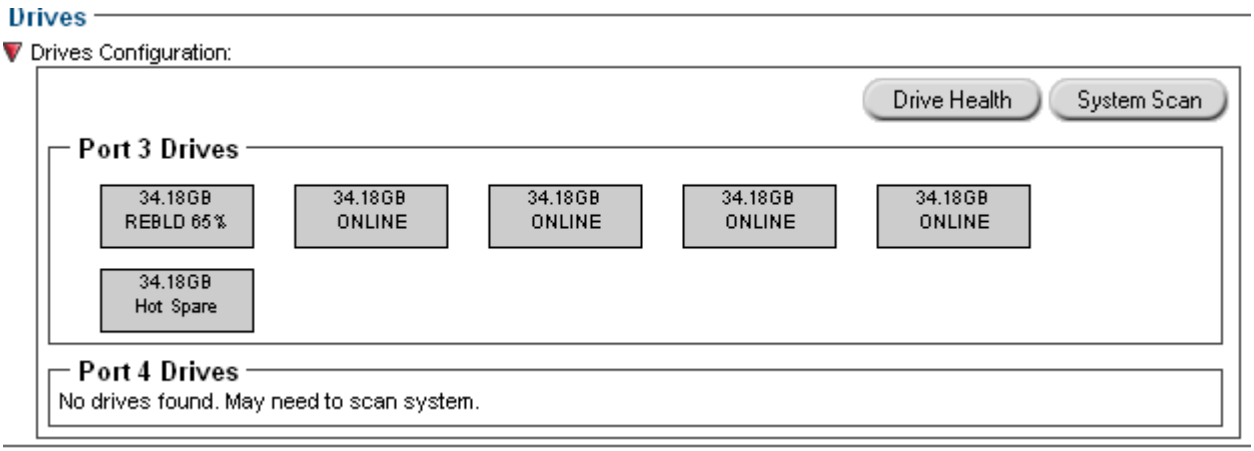
A RAID rebuild may take up to two hours to complete.

1. If you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Use the ExpressNAV interface on page 29, in a standard browser, click **Enter Here** and type in your user name and password.
2. Click on the **FastStream** arrow.
3. Click on the **Add/Remove Hot Spares** button



4. Click on **Next**.
5. The **Add/Remove Hot Spares** page appears. Follow the on-screen directions. When you complete your changes, click on **Commit**.
6. A warning box appears. In the warning box, verify that you want to complete the configuration by clicking on **Yes**. Clicking on **No** ends the procedure without making a change.
7. When the process is complete, the **Health and Status Monitor** page appears.

Exhibit 2.0-4 Various screens throughout the ExpressNAV interface show you the status of drives, including Hot Spare designations.



2.4 Optional changes to system configurations

Default values are appropriate for most configurations, but may be modified for your needs using the ExpressNAV browser-based user interface.

It is best practice to change the default user name and password to a user name and password significant to you. Other configurations may also be changed, however, use extreme caution when changing default values.

Change current user name, password

1 Open a Command Line Interface session either using Telnet or the serial port as shown in Interface options on page 29.
2 Type **set Username [user name]**
3 Press **Enter.**
4 Type **set Password**
5 Press **Enter.**
6 Follow the instructions on the screen to confirm your old and new password.

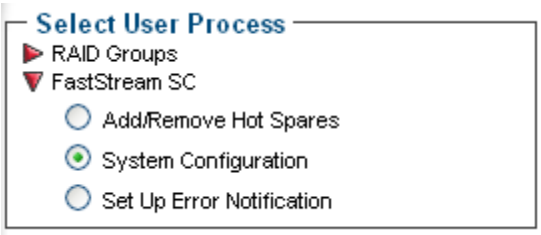
Note

The user name is case insensitive and password is case sensitive.

The user name and password for all Telnet, FTP and ExpressNAV user interface sessions is changed.

System Configuration

1 If you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Use the ExpressNAV interface on page 29, in a standard browser, click **Enter Here** and type in your user name and password.
2 In the left side menu items, click on the **Manage** button.
3 Click on **Next.**
4 Click on the **FastStream** menu item.
5 Click on the **System Configuration** button



6 Click on **Next**.
7 You may change whether the system uses the Simple Network Time Protocol or a manually set time; the data rate, connection mode and hard address value of each Fibre Channel port. When you have completed your changes, click on **Commit**.

Advanced CLI page

Changes to other parameters may be made using the **Advanced** page.

CAUTION

Do not use this page unless you are directed to by an ATTO technician. Changing parameters may cause loss of data and/or disruption to performance and reliability of the FastStream.

Note

The ExpressNAV interface is the preferred method to manage the FastStream SC 5700.

1 If you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Use the ExpressNAV interface on page 29, in a standard browser, click **Enter Here** and type in your user name and password.

2 In the left-hand menu, click on the **Advanced** menu item.

3 The **Advanced CLI Configuration** page appears. Wait for the **Ready** prompt, then type in the CLI command in the text box provided. Refer to CLI provides an ASCII-based interface on page iii of the Appendix..

4 Click the **Submit** button: this is equivalent to typing in the CLI command into a telnet or serial port CLI session.

A text field beneath the box lists the most recent commands issued to the FastStream through this page. If you enter an incorrect parameter, the CLI help text is displayed, showing the parameters available. An asterisk next to the **Ready** prompt indicates you must type **SaveConfiguration restart** in the text box for changes to take effect.

3.0 Monitor storage, configurations

You may determine the performance of drives attached to the FastStream SC 5700 using various displays and tests in the ExpressNAV interface.

The following instructions assume you have already set up RAID groups. Refer to Designing RAID groups on page i of the Appendix and Configure RAID on page 7.

The ATTO FastStream SC 5700 collects various metrics to measure performance for physical drives not in RAID groups during normal system operation and drive initialization and verification.

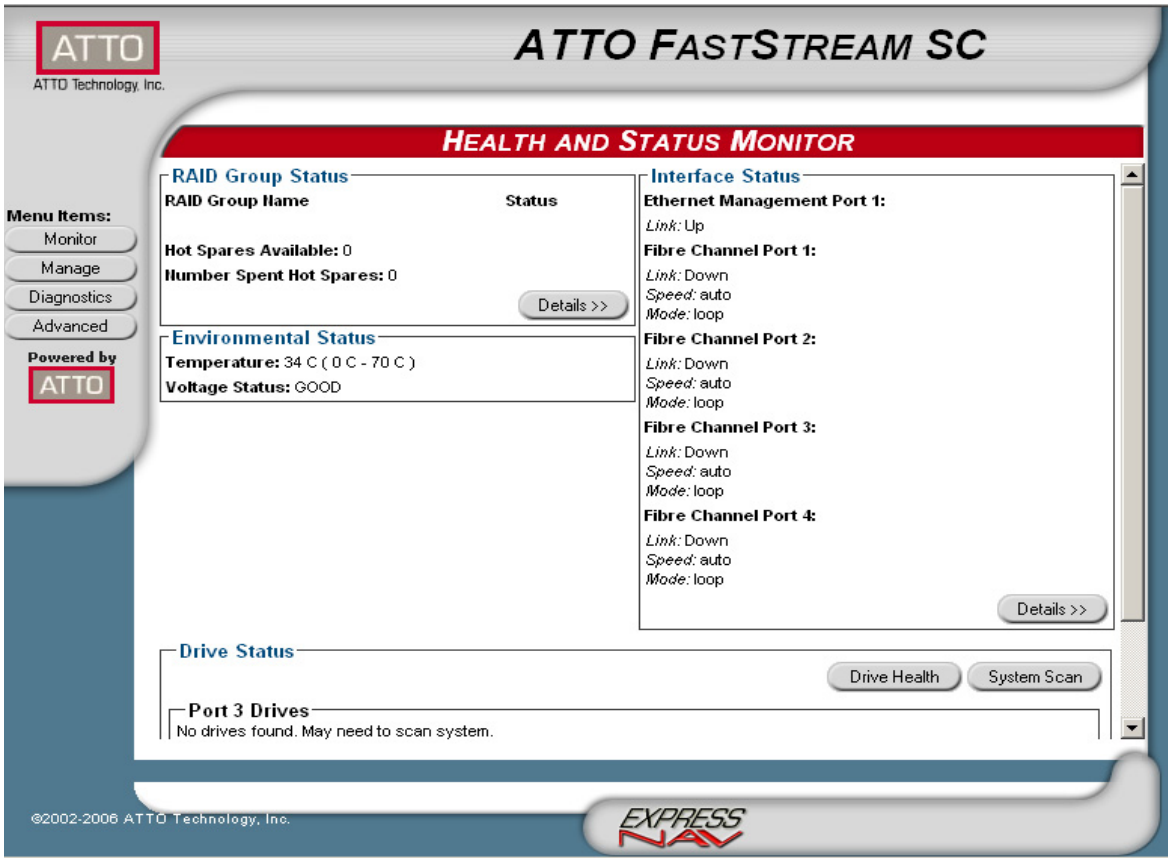
CAUTION

New performance data is updated every 60 seconds which impacts performance slightly, even if you minimize the browser window. Close the ExpressNAV interface completely whenever you need maximum performance.

Health and Status Monitor page

When you open the ExpressNAV interface, the **Health and Status Monitor** page appears. You may also reach it at any time by clicking on **Monitor** on the **Menu Items** list on the left hand side of the ExpressNAV interface.

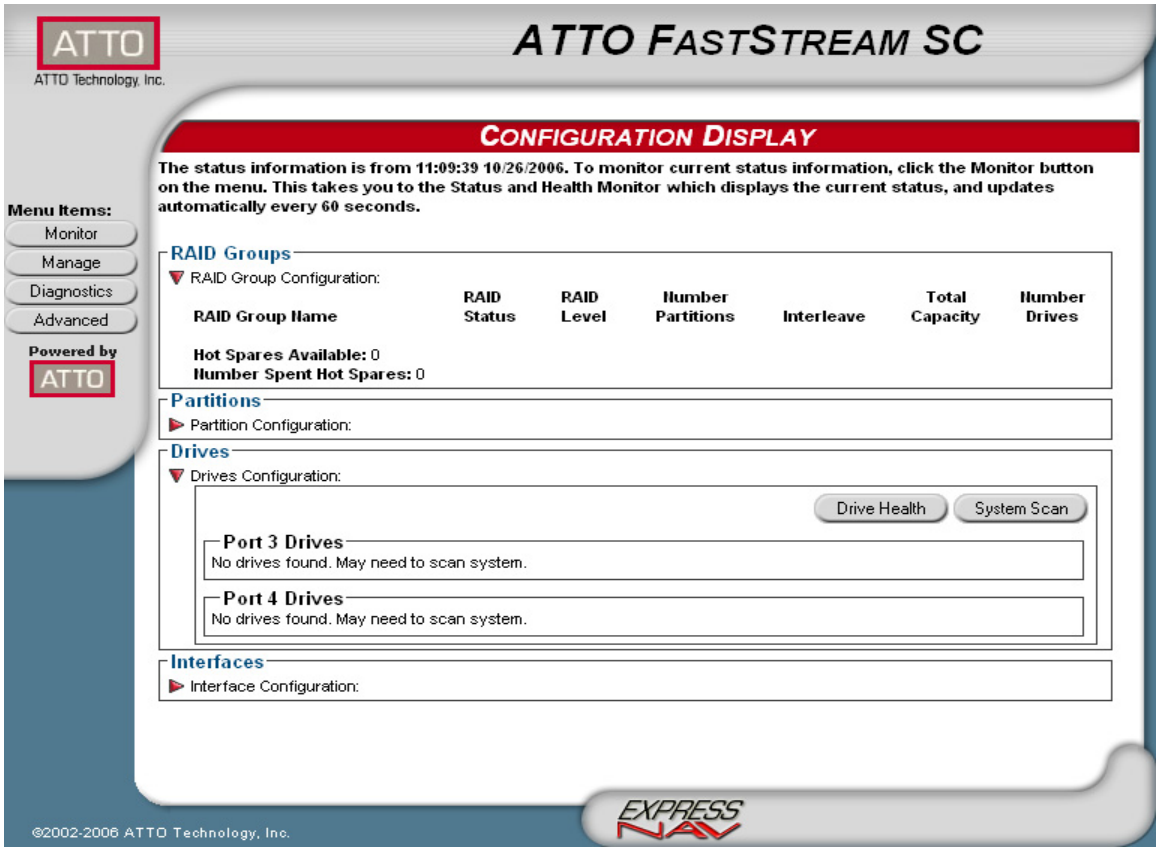
Clicking on **Details** gives you added information about each parameter by opening the **Configuration Display** page.



Configuration Display page

Clicking on **Details** from the **Health and Status Monitor** page gives you added information about various aspects of the FastStream SC 5700 and attached storage. Click on the arrow next to the group you wish to view.

- RAID groups: RAID group names, RAID status, available Hot Spares, number of faulted drives, RAID Level, number of partitions, Interleave and total capacity of each RAID group.
- Partitions: RAID group name, partition ID, capacity and block size
- Drives: Drive Configuration by port, including drive size and status
- Interfaces: Ethernet management port link status and Fibre Channel port link, speed, connection mode, Node Name and Port Name.



Phone home: E-mail messages

E-mail notification allows the FastStream SC 5700 to send an E-mail message to you, a network administrator or other users when certain events occur with the FastStream. Serious error messages are sent immediately, while messages for less serious errors are sent every 15 minutes.

- Device transitions from online to offline
- Critical and warning temperature conditions
- Critical and warning voltage conditions
- Power recycle/power failure conditions

Warning messages include:

- device down
- medium error
- abort command

Critical messages include hard errors.

Warning levels include:

- **All** means warnings, critical events and informational messages are sent.
- **Critical** means only critical event E-mails are sent.
- **Warning** means only warnings and critical event E-mails are sent.
- **None** means no E-mails are sent.

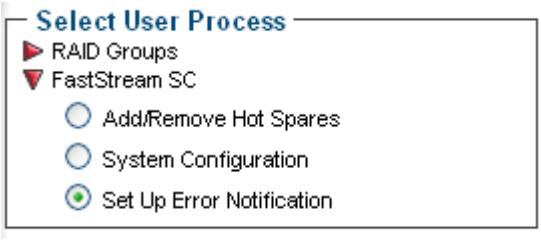
You may send E-mails to up to five E-mail addresses and designate which conditions prompt each E-mail notification.

For example, a recipient with a critical severity level only receives critical messages and not warning or informational messages.

When an event occurs that warrants E-mail notification, the FastStream SC 5700 sends the message; it cannot respond to a rejection by a server for an invalid address. Ensure all E-mail addresses typed in are valid.

Each E-mail is time stamped when it leaves as part of the SMTP header information as shown in Exhibit 3.0-1.

1 If you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Discover the IP address on page 5, in a standard browser, click **Enter Here** and type in your user name and password.
2 The **Health and Status** page appears.
3 Click on the **Manage** button.



4 Click on the **FastStream** arrow.
5 Click the **Set up Error Notification** button
6 Click **Next.**
7 Click on the **Enabled** button for **Notification Configuration**
8 Type in the sender address (E-mails show this name in the **From** field)
9 Type in the SMTP Server IP Address
10 Type in the user name and password of your SMTP E-mail account
11 Type in up to five E-mail addresses
12 Choose **All**, **Critical** or **Warning** for each E-mail address.
13 When all information is typed in, click **Commit**.
14 Your settings are displayed. You may change or disable E-mail notification at any time by clicking on the **Manage** menu item, then on the **FastStream** arrow, then on the **Set Up Error Notification** button.

Exhibit 3.0-1 The E-mail messages sent by the FastStream SC 5700 follow this format.

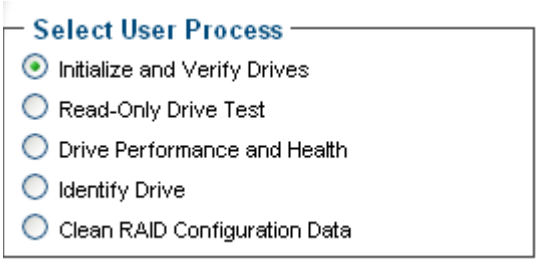
```
Subject: [The Type of Event that Occurred]

Message Body:

This is a status message from [FastStream name]. Identifying information as well
as the most recent entries from the event log appear below.
*************** Unit Information  ***************
Serial Number : [Serial Number]
IP Addresses:  [IP Address1]
               [IP Address2]
***************  Event Log Entries  ****************
[Listing of the ten latest event log entries]
```

Identify drive issues

If you close the browser or navigate away from this page, you may re-access these results by clicking the **Diagnostics** button and choosing the **Drive Performance and Health** option. Results are available until the FastStream is restarted.

Preliminary steps

1 If you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Use the ExpressNAV interface on page 29, in a standard browser, click **Enter Here** and type in your user name and password.
2 Click the **Diagnostics** button
3 Click on the button for process you wish to use.



Initialize and verify drives

You may verify the status of storage which does not belong to a RAID group (unattached storage).

If the verify operation detects an error, the FastStream tries to re-initialize the drive, erasing information stored on the drive. Be sure to back up data before performing verification.

CAUTION

Data may be erased during this process. Back up your data before selecting Commit.

1 Follow the instructions in Preliminary steps on page 20.
2 Click the **Initialize and Verify** button
3 Click **Next**
4 If no drives appear in the information box, click on the **System Scan** button.
If drives are available, click on the drives you wish to test; the drives are highlighted. Drives which belong to RAID groups cannot be selected.
5 Select **Verify Only**
6 Click **Commit**
7 A warning box appears. In the warning box, verify that you want to complete the configuration by clicking on **Yes**. Clicking on **No** ends the procedure without making a change.

Scan drive surfaces: read only drive test

The read only test performs a non-destructive scan over the entire surface of each drive to identify bad areas of the disk drives and determine read performance. It may be run while data is passing through the FastStream.

Running this test may negatively impact performance. Once the Read-only test has completed, system operation returns to normal.

1 Follow the instructions in Preliminary steps on page 20.
2 Click the **Read-Only Drive Test** button
3 Click **Next**
4 If no drives appear in the information box, click on the **System Scan** button.
If drives are available, click on the drives you wish to test; the drives are highlighted.
5 Click **Commit**
6 A warning box appears. In the warning box, verify that you want to complete the configuration by clicking on **Yes**. Clicking on **No** ends the procedure without making a change.

Measure drive performance and health

New performance data is updated every 60 seconds which impacts performance slightly, even if you minimize the browser window. Exit the browser ExpressNAV interface completely whenever you need maximum performance.

During the testing process, the **Drive Performance and Health** screen appears. Click on **Show Help Text and Drives** for an alternative view of the test progress.

During the tests the **Time Remaining** box tells you how much time remains until the verification process is complete. The representation of each drive in the **Drives** box shows the percentage of verification completed.

When the test is complete, click on each drive to see its information highlighted in the **Drive Metrics** window.

1 Follow the instructions in Preliminary steps on page 20.
2 Click on **Drive Performance and Health**.
3 Click **Next.**
4 The **Drive Performance and Health** page appears. Click on a drive in the drive section.
5 Click **Start**.
6 Drive performance is displayed under the **Drive Metrics** section of the **Drive Performance and Health** page. Drive errors are displayed in the **Drive Errors** section of the page.

Identify a drive attached to the FastStream

CAUTION

Executing this command will adversely impact performance and throughput for the time that the LED is illuminated.

1 Follow the instructions in Preliminary steps on page 20.
2 Click on **Identify Drive**.
3 The **Identify Drive** page appears. Click on any drive. Only one drive may be selected at a time.
4 Click **Commit**. The I/O LED of the drive illuminates for one minute.
5 To stop the operation, unselect the drive.

Note

To clean RAID configuration data, refer to Update RAID configuration data on page 26.

4.0 Modify storage

Use the ExpressNAV interface to replace a failed drive, add new drives or redesign RAID configurations.

CAUTION

Clicking on Commit during RAID configuration causes all previous storage data on the drive to be erased. Ensure all data is backed up.

You may modify various aspects of storage using the **Manage Menu** found by clicking on the tab on the left hand side of the ExpressNAV interface. Be cautious when deleting storage or rearranging storage configurations because data could be compromised or lost.

The ExpressNAV interface takes you step by step through many procedures which allow you to modify your storage and RAID configurations. Read all notes and cautions carefully as you go to ensure the best performance and use of your storage.

When you initially set up the FastStream, replace a failed drive or add new drives to the FastStream, perform drive initialization and verification to these drives.

Many of these procedures are only available on unallocated storage which is not currently part of a RAID group, not designated as a Hot Spare, or was offline when you initially set up RAID configurations.

Initialize and verify drives

During initialization, the FastStream writes a pattern to the entire drive. This operation attempts to fix soft errors and reallocate bad blocks on existing drives.

CAUTION

Selecting Drive Initialization causes all previous storage data on the drive to be erased. Make sure all of your information is backed up before initializing drives.

1. If you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Use the ExpressNAV interface on page 27, in a standard browser, click **Enter Here** and type in your user name and password.
2. Select **Initialize and Verify Drives**
3. Click **Next**
4. Select **Initialize and Verify**
5. All eligible drives are highlighted in green; the system only initializes highlighted drives. Ensure only the drives you are initializing are selected. Click **Commit**

CAUTION

Do not restart the FastStream or disconnect or power cycle drives during Drive Initialization and Verification or you must start the verification process from the beginning.

Preliminary steps

Note

An unallocated drive or unallocated storage is storage which is not part of a RAID Group and not designated as a Hot Spare.

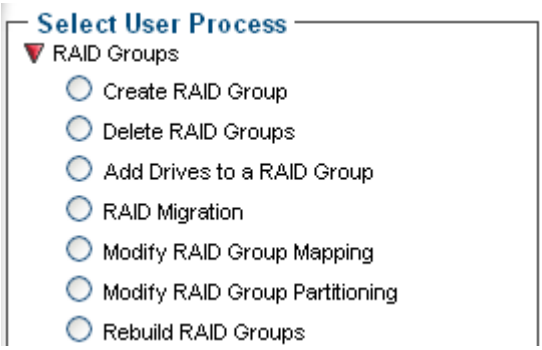
1. If you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Use the ExpressNAV interface on page 27, in a standard browser, click **Enter Here** and type in your user name and password.
2. The **Health and Status Monitor** page appears.
3. Click on the appropriate button on the left hand side of the ExpressNAV interface.
4. Select the operation you wish to perform from the next menu presented.

RAID group processes

CAUTION

Clicking on Commit during RAID configuration causes all previous storage data on the drive to be erased. Ensure all data is backed up.

Follow the instructions in Preliminary steps on page 23, click on the **Manage** menu item on the left hand side of the page, then choose which process you wish to enable.



Add drives to a RAID group

If you have unallocated drives, you can increase the number of drives used by an existing RAID group by adding an unallocated drive to the Group. You may have to add more than one drive depending on the RAID group setup.

1. Initialize and verify the drives you are adding to the new RAID group as outlined in Initialize and verify drives on page 20.
2. Follow the instructions in Preliminary steps on page 23 and click on the **Manage** menu item on the left side of the page and then the **RAID Groups** arrow.
3. Click on **Add Drives to a RAID Group**
4. Click on **Next**
5. Select the RAID group you wish to add the drives to from the drop down menu.
6. Click on the drives you wish to add to your RAID group

CAUTION

Adding drives to an existing RAID group may adversely impact performance. You cannot reverse this operation unless you delete the RAID group.

7. When you have completed your changes, click on **Commit.**
8. A warning box appears. In the warning box, verify that you want to complete the configuration by clicking on **Yes**. Clicking on **No** ends the procedure without making a change.
9. When the process is complete, the **Health and Status Monitor** page appears.

Change RAID configuration: RAID migration

If you have unallocated drives, you can use them to change the parity protection of an existing RAID group. The following migration levels are supported:

- JBOD to RAID Level 0
- JBOD to RAID Level 1
- RAID Level 0 to RAID Level 10
- RAID Level 1 to RAID 10
- N-way mirroring: add additional redundancy to RAID Level 1

1. Initialize and verify the drives you are adding as outlined in Initialize and verify drives on page 20.
2. Follow the instructions in Preliminary steps on page 23 and click on the **Manage** menu item on the left side of the page and then the **RAID Groups** arrow.
3. Click on the **RAID Migration** button.
4. Click on **Next**.
5. Follow the on-screen directions. When you have made your changes, click on **Commit**.
6. A warning box appears. In the warning box, verify that you want to complete the configuration by clicking on **Yes**. Clicking on **No** ends the procedure without making a change.
7. When the process is complete, the **Health and Status Monitor** page appears.

Modify RAID group mapping

You may change the LUNs of drives manually or let the ExpressNAV interface map drives for you.

1. Follow the instructions in Preliminary steps on page 23 and click on the **Manage** menu item on the left side of the page and then the **RAID Groups** arrow.

2 Click on the **Modify RAID Group Mapping** button.

3 Click on **Next**.

4 Follow the on-screen directions. When you have made your changes, click on **Commit**.

5 A warning box appears. In the warning box, verify that you want to complete the configuration by clicking on **Yes**. Clicking on **No** ends the procedure without making a change.

6 When the process is complete, the **Health and Status Monitor** page appears.

Modify RAID group partitions

For an explanation of partitions, refer to Partition RAID groups on page 11.

CAUTION

Modifying partitions may cause loss of existing data.

1 Follow the instructions in Preliminary steps on page 23 and click on the **Manage** menu item on the left side of the page and then the **RAID Groups** arrow.

2 Click on the **Modify RAID Group Partitioning** button

3 Click **Next**

4 Select the **RAID Group Name** from the drop down menu

5 Using the graphic and drop down boxes, choose to either merge or split existing partitions or assign different values for the partition sizes.

6 Click **Commit**

7 A warning box appears. In the warning box, verify that you want to complete the configuration by clicking on **Yes**. Clicking on **No** ends the procedure without making a change.

8 When the process is complete, the **Health and Status Monitor** page appears.

Rebuild RAID groups

If RAID groups become compromised in some fashion, you must rebuild groups.

1 Follow the instructions in Preliminary steps on page 23 and click on the **Manage** menu item on the left side of the page and then the **RAID Groups** arrow.

2 Click on the **Rebuild RAID Groups** button.

3 Click on **Next**.

4 Follow the on-screen directions, ending by clicking on **Commit.**

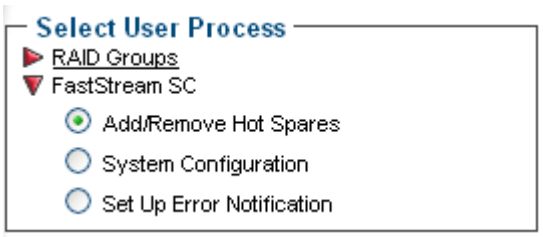
5 A warning box appears. In the warning box, verify that you want to complete the configuration by clicking on **Yes**. Clicking on **No** ends the procedure without making a change.

6 When the process is complete, the **Health and Status Monitor** page appears.

FastStream process: add or remove Hot Spares

For an explanation of Hot Spares, refer to Use Hot Spares on page 13.

1 Follow the instructions in Preliminary steps on page 23 and click on the **Manage** menu item on the left side of the page and then the **FastStream SC** arrow.



2 Select the **Add/Remove Hot Spares** button.

3 Click **Next**

4 Select the drive(s) you want to add or remove from the Hot Spare pool.

5 When you have completed your changes, click **Commit**.

6 A warning box appears. In the warning box, verify that you want to complete the configuration by clicking on **Yes**. Clicking on **No** ends the procedure without making a change.

7 When the process is complete, the **Health and Status Monitor** page appears.

Note

*For **System Configuration** and **Set Up Error Notification**, refer to Change system configurations on page 15 and Phone home: E-mail messages on page 18*

Update RAID configuration data

If you move single drives between devices without erasing the drives, you may want to clean stale RAID configuration data from the drives, permanently removing the drive from the previous RAID group. Drives must belong to a RAID group now or have once belonged to a RAID group and are labeled **Replaced** after system scans.

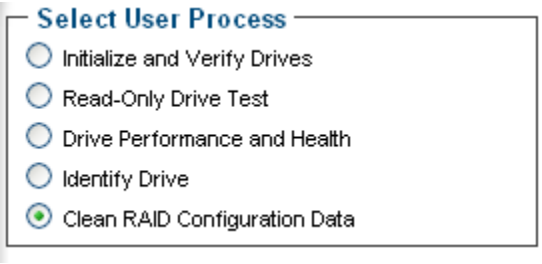
CAUTION

Continue with extreme caution: data is lost on the drive when it is cleaned of RAID information.

1 Follow the instructions in Preliminary steps on page 23.

2 Click the **Diagnostics** button on the **Menu Items** list on the left hand side of the ExpressNAV interface.

3 Click in the **Clean RAID Configuration data** radio button.



4 Click **Next**

5 Click on the drives you wish to update; the drives are highlighted.

6 Click on **Commit**

7 A warning box appears. In the warning box, verify that you want to complete the configuration by clicking on **Yes**. Clicking on **No** ends the procedure without making a change.

8 When the process is complete, the **Health and Status Monitor** screen appears

Note

To clean Hot Spare information from a drive, use the instructions in FastStream process: add or remove Hot Spares on page 25.

5.0 Update firmware, configuration data

You can update the ATTO FastStream SC 5700 at any time. Refer to the ATTO Technology Inc. website, ***www.attotech.com,*** *for current information.*

Several methods are available to update the ATTO FastStream firmware and to re-initialize attached storage. Be sure all data is backed up before using any of these procedures to prevent data loss.

Update firmware

The ATTO FastStream SC 5700 has several processors which control the flow of data. The firmware to control these processors can be upgraded in the field using the PUT command from an FTP connection or the zModem utility over an RS-232 serial connection.

Preliminary steps

1 The ATTO FastStream SC 5700 firmware is distributed as a compressed .zip file. Uncompress the **.zip** file into an image file (**.ima**). Note the filename. The **.zip** file can be uncompressed using any utility that supports the **zip** format.

CAUTION

Ensure that all I/O to the ATTO FastStream SC 5700 has stopped.

During this procedure*, do not* **interrupt the flash process. Do not power down the host or the ATTO FastStream SC 5700 until the display returns the Ready prompt. Interrupting the flash process makes your ATTO FastStream SC 5700 inoperable and you must return it to ATTO for repair.**

2 Decide whether to use FTP over Ethernet or a terminal program using the RS-232 serial link, and continue with one of the following procedures.

Use FTP over Ethernet

1 Establish an FTP link to the ATTO FastStream SC 5700 that is to be flashed.

2 Use the **PUT** command to download the firmware. For example

```
PUT c:\firmware\FB5700100.IMA
```

3 Once the download is complete, cycle power on the ATTO FastStream SC 5700 to implement the new firmware.

Use the RS-232 serial link

1 Load a Terminal Program such as Hyper Terminal.

2 Set the terminal and the ATTO FastStream SC 5700 for the highest possible baud rate for your terminal.

3 Turn on power to the ATTO FastStream SC 5700.

4 Once the Ready prompt appears, type **ZMODEM RECEIVE.** The ATTO FastStream SC 5700 displays that it is preparing to receive a file from your terminal program.

5 On the terminal program, choose **Transfer Send File**

6 In the **Send File** box, type in the current ATTO FastStream SC 5700 **.ima** file or click the browse button to find it

7 Click **Send File**

8 The ATTO FastStream SC 5700 should acknowledge receiving the file and display a message not to interrupt power for 90 seconds.

9 Once the download is complete, cycle power on the ATTO FastStream SC 5700 to invoke the new firmware.

Update RAID configuration data

If you move single drives between devices without erasing the drives, you may want to clean stale RAID configuration data from the drives, permanently removing the drive from the RAID group. Drives must belong to a RAID group now or have once belonged to a RAID group and are labeled **Replaced** after system scans.

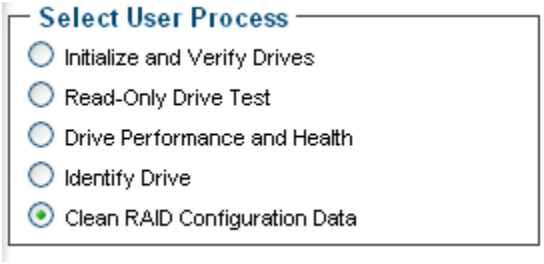
CAUTION

Continue with extreme caution: data is lost on the drive when it is cleaned of RAID information.

1. If you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Use the ExpressNAV interface on page 29, in a standard browser, click **Enter Here** and type in your user name and password.
2. Click the **Diagnostics** button on the **Menu Items** list on the left hand side of the ExpressNAV interface.
3. Click in the **Clean RAID Configuration data** radio button.
4. Click **Next**
5. Click on the drives you wish to update; the drives are highlighted.
6. Click on **Commit**
7. A warning box appears. In the warning box, verify that you want to complete the configuration by clicking on **Yes**. Clicking on **No** ends the procedure without making a change.
8. When the process is complete, the **Health and Status Monitor** screen appears

Note

*To clean Hot Spare information from a drive, use the **Add/Delete Hot Spares** from the **Menu Items** list on the left hand side of the ExpressNAV interface. Refer to FastStream process: add or remove Hot Spares on page 25.*



6.0 Interface options

The best way to manage, monitor and configure the FastStream SC 5700 is to use the ExpressNAV interface, but you may use a terminal emulation program or Telnet.

Use the ExpressNAV interface

Use the ExpressNAV interface to manage, monitor and configure the unit. The choices you make lead you from screen to screen. Choices which are not available are greyed out.

1 Working from the computer attached to the FastStream SC 5700 Ethernet port, open your browser and type in the FastStream SC 5700 IP address as noted in Discover the IP address on page 5.

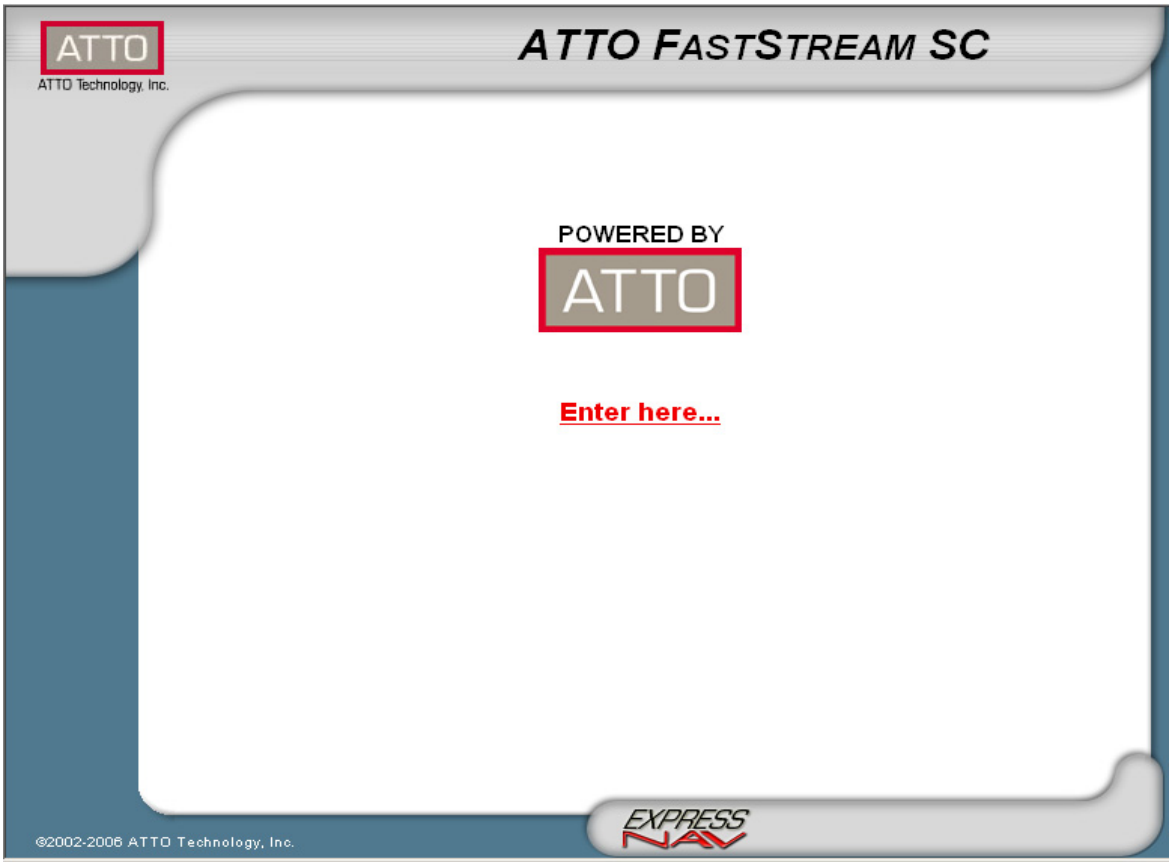
2 Your browser points to the ExpressNAV splash screen. Press **Enter.**

3 Type in the user name and password values.

Note

*The default values are user name: **root** and password: **Password**. The user name is case insensitive and the password is case sensitive. It is best practice to change the defaults: refer to Change current user name, password on page 15.*

The pages which next appear depend on whether or not you have begun configuring the FastStream SC 5700. Refer to Configure RAID on page 7.



Use the serial port

To connect to a terminal emulation program or Telnet to manage the FastStream SC 5700, use the serial port.

1 Connect a cable from FastStream SC 5700 RS-232 serial port or header to the serial (COM) port on a personal computer.

2 Turn on the FastStream SC 5700.

3 Start a terminal emulation program on the personal computer, and use it to connect to the FastStream SC 5700. For example, if you are using HyperTerminal on a computer running a Windows operating system,

   a. Type **FastStream 5700** in the **New Connection** dialog box.
   b. Click **OK**.
   c. In the **Connect To** dialog box, for the **Connect using field** select the COM port number to which your serial cable is connected.
   d. Click **OK**.
   e. In the COM Properties dialog box select the following values:
      - Bits per second: 115200
      - Data Bits: 8
      - Parity: None
      - Stop Bits: 1
      - Flow Control: None
      - Terminal type: ASCII
      - Echo: on
   f. Click **OK.**

4 After you connect to the FastStream SC 5700, start-up messages are displayed. The last line in the start-up message sequence is **Ready**.

Make adjustments to the FastStream SC 5700 using the Command Line Interface as described in CLI provides an ASCII-based interface on page iii of the Appendix.

Note

*In serial port sessions, there is no prompt on the line below the word **Ready**. Begin typing commands in the blank line where the cursor is resting. No user name or password is required for serial port access.*

5 To verify that you have connected successfully, type **help** after the **Ready** prompt and press **Enter.**

If a list of all available commands does not appear on the screen, review the steps in this section, check the cable, or contact service personnel until the problem is solved.

If you have difficulty using the serial port, verify that you have the correct settings and that your serial cable is less then two meters in length.

Use Telnet

Up to three Telnet sessions can be conducted simultaneously. A serial port session can use the CLI while Telnet sessions are open. Whichever session issues the first “set” CLI command can continue to issue set commands, while the other sessions can only issue “get” commands or display information. Once a connection is established, refer to Designing RAID groups on page i of the Appendix.

1 Connect to the FastStream SC 5700 from a computer on the same Ethernet network.

2 Start a Telnet session.

Note

There is more than one way to connect to the FastStream SC 5700 using a telnet program.Your telnet program may operate differently than in the following instructions.

3 At the telnet prompt, issue the **open** command where x.x.x.x is the IP address of the FastStream SC 5700.

```
telnet > open x.x.x.x
```

4 If you have to specify a port type, type in the port type “telnet” and the terminal type “SC100”.

```
port type: telnet
terminal type: SC100
```

5 Type in the default values for the user name, **root,** and the password, **Password**, if you did not set new values in Discover the IP address on page 5.

Appendix A Designing RAID groups

The ATTO FastStream SC 5700 provides instant hardware data protection and intelligence to existing Fibre Channel storage independent of the storage type.

CAUTION

Selecting RAID configuration causes all previous storage data on the drive to be erased. Make sure all of your information is backed up before setting up RAID groups.

RAID improves data accessibility and reliability during normal operations, but you still need a good backup strategy for long-term protection of your data.

The ATTO FastStream SC 5700 allows RAID functionality. In general, the process begins with individual drives also called block devices.

Note

If a drive has corrupt or outdated configuration data, that drive cannot be assigned to any RAID group. Ensure all drives to be assigned to RAID groups are configured properly. Refer to Initialize and verify drives on page 20 and Update RAID configuration data on page 28.

A RAID group is a virtual, independent single drive whose data is written to physical drives according to a RAID algorithm. The ATTO FastStream SC 5700 supports JBOD, RAID Level 0, RAID Level 1, DVRAID, RAID Level 10 and RAID Level 5.

JBOD (Just a Bunch of Disks)

JBOD (Just a Bunch of Disks) configuration allows many individual drives to be available for normal storage operations with no special data protection.

Using the ATTO FastStream SC 5700 allows you to concatenate several individual drives into one large drive.

A JBOD drive can be constructed as a special case of a RAID group. When multiple physical drives are assigned to a JBOD RAID group, their storage areas appear as a single spanned area of storage. The ATTO FastStream SC 5700 supports 1 to 32 drives per JBOD-configured RAID group.

Exhibit A-1 JBOD: Just a Bunch of Disks: no redundancy; each disk is treated independently

JBOD

Disk 0	Disk 1	Disk 2
D0	D4	D8
D1	D5	D9
D2	D6	D10
D3	D7	D11

RAID Level 0

RAID Level 0 (striping) is based on the fact that increased performance can be achieved by simultaneously accessing data across multiple drives, increasing data transfer rates while reducing average access time by overlapping drive seeks. RAID Level 0 groups provide data that is striped across several drives. Drives are accessed alternately, as if stacked one on top of the other.

RAID Level 0 provides no data protection. If one drive fails, all data within that stripe set is lost.

The ATTO FastStream SC 5700 supports 2 to 32 drives per RAID Level 0 group.

RAID Level 0 is used by applications requiring high performance for non-critical data.

Exhibit A-2 RAID Level 0, no redundancy

RAID Level 0

Stripe	Disk 0	Disk 1	Disk 2	Disk 3	Disk 4	Disk 5
0	D0	D1	D2	D3	D4	D5
1	D6	D7	D8	D9	D10	D11
2	D12	D13	D14	D15	D16	D17
3	D18	D19	D20	D21	D22	D23

RAID Level 1

RAID Level 1 ensures the security of data by writing the exact same data simultaneously to two or more different drives. This application is for users with critical data which cannot be lost or corrupted due to the failure of a single drive.

With RAID Level 1, the host sees what it believes to be a single physical drive of a specific size: it does not know about the mirrored pair.

The ATTO FastStream SC 5700 manages where data is written and read, allowing one drive to fail without the host knowing it has failed. RAID Level 1 is used in applications containing mission critical data. The ATTO FastStream SC 5700 supports an even number of 2 to 32 drives per RAID Level 1 group.

Exhibit A-3 RAID Level 1: Data is written to two or more drives simultaneously.

RAID Level 1

Stripe	Disk 0	Disk 1	Disk 2	Disk 3	Disk 4	Disk 5
0	D0	D0	D4	D4	D8	D8
1	D1	D1	D5	D5	D9	D9
2	D2	D2	D6	D6	D10	D10
3	D3	D3	D7	D7	D11	D11

DVRAID (Digital Video RAID)

Digital Video RAID provides parity redundancy for your data. Optimized for performance for the high data transfer rates required in digital video environments, DVRAID is ATTO Technology proprietary technology which supports the editing of uncompressed 10-bit High Definition (HD) video and multiple streams of real-time, uncompressed Standard Definition (SD) video.

You must use the Quick Digital Video setup wizard in the ExpressNAV interface for 6, 7, 12, 14 or 24 drives.

RAID Level 10

RAID Level 10 increases data transfer rates while ensuring security by writing the exact same data simultaneously to two or more different drives.

RAID Level 10 is used in applications requiring high performance and redundancy, combining the attributes of RAID Levels 1 and 0.

The ATTO FastStream SC 5700 supports an even number of 4 to 32 drives per RAID Level 10 group.

Exhibit A-4 RAID Level 10 with mirroring and spanning; redundancy is shown in shaded blocks.

RAID Level 10

Stripe	Disk 0	Disk 1	Disk 2	Disk 3	Disk 4	Disk 5
0	D0	D0	D1	D1	D2	D2
1	D3	D3	D4	D4	D5	D5
2	D6	D6	D7	D7	D8	D8
3	D9	D9	D10	D10	D11	D11

RAID Level 5

RAID Level 5 increases reliability while using fewer drives than mirroring by employing parity redundancy. Distributed parity on multiple drives allows you to rebuild a failed drive from the remaining good drives. The ATTO FastStream SC 5700 operates in degraded mode if a drive fails.

The ATTO FastStream SC 5700 supports 3 to 16 drives per RAID Level 5 group.

Exhibit A-5 RAID Level 5 with parity blocks shaded.

RAID Level 5

Stripe	Disk 0	Disk 1	Disk 2	Disk 3	Disk 4	Disk 5
0	D0	D1	D2	D3	D4	P0-4
1	D6	D7	D8	D9	P5-9	D5
2	D12	D13	D14	P10-14	D10	D11
3	D18	D19	P15-19	D15	D16	D17
4	D24	P20-24	D20	D21	D22	D23
5	P25-29	D25	D26	D27	D28	D29

Appendix B CLI provides an ASCII-based interface

The command line interface (CLI) uses ASCII commands typed while in CLI mode.

CAUTION

Do not use CLI unless you are directed to by an ATTO technician.
Changing parameters may cause loss of data and/or disruption to performance and reliability of the FastStream.
The ExpressNAV interface is the preferred method to operate and manage the FastStream SC 5700. Refer to Interface options on page 29 for details.

The command line interface (CLI) is a set of ASCII-based commands which perform configuration and diagnostic tasks. Refer to Interface options on page 29.

- CLI commands are context sensitive and generally follow a standard format

```
[Get|Set] Command [Parameter1|Parameter2]
```

  followed by the **return** or **enter** key
- CLI commands are case insensitive: you may type all upper or all lower case or a mixture. Upper and lower case in this manual and the **help** screen are for clarification only.
- Commands generally have three types of operation: get, set and immediate.
- The get form returns the value of a parameter or setting and is an informational command.
- Responses to get commands are followed by **Ready**.
- The set form is an action that changes the value of a parameter or configuration setting. It may require a **SaveConfiguration** command and a restart of the system before it is implemented. The restart can be accomplished as part of the **SaveConfiguration** command or by using a separate **FirmwareRestart** command. A number of set commands may be issued before the **SaveConfiguration** command.
- Responses to **set** commands are either an error message or **Ready. *.** The asterisk indicates you must use a **SaveConfiguration** command to finalize the **set** command.
- Set commands which do not require a **SaveConfiguration** command, defined as immediate commands, are immediately executed.

Note

Using certain CLI commands during normal operation can cause a performance drop. Once command actions are complete, performance should return to normal levels.

Exhibit A-6 Symbols, typefaces and abbreviations used to indicate functions and elements of the command line interface used in this manual.

Symbol	Indicates
[ ]	Required entry
< >	Optional entry
|	pick one of
\n	end of line
-	a range (6 – 9 = 6, 7, 8, 9)
Boldface words	must be typed as they appear
Italicized words	Arguments which must be replaced by whatever they represent
fl	Fibre Channel lun number (0 <= fl <= 31)
fp	Fibre Channel port number (0<= fp <= 4)
mp1	Ethernet port used to manage the FastStream SC 5700
BlockDevID	index designation of a block device not assigned to any other RAID group
GroupName	ASCII name of a RAID group
GroupName	the name of the RAID group to which the block device is assigned, or blank if the block device is available
MemberIndex	index designation of a RAID group member

CLI error messages

The following error messages may be returned by the Command line Interface

```
ERROR. Invalid Command. Type 'Help' for command list.
ERROR. Wrong/Missing Parameters
Usage: <usage string>
ERROR Invalid RAID Group state
ERROR Invalid Block Device index
ERROR Invalid RAID Member index
ERROR Maximum number of RAID Groups exceeded
ERROR Insufficient number of RAID Group members
ERROR
Block Device at specified index no longer available
ERROR Insufficient RAID Group members for RAID type
```

CLI summary

The following chart summarizes the Command Line Interface commands, their defaults, and an example of how to enter the commands. Commands which have no default values have a blank entry in that column of the table.

CAUTION

Do not use CLI unless you are directed to by an ATTO technician. Changing parameters may cause loss of data and/or disruption to performance and reliability of the FastStream. The ExpressNAV interface is the preferred method to operate and manage the FastStream SC 5700. Refer to Interface options on page 29 for details.

Command	Default	Example
AutoMap		automap
AutoResume	rebuild =enabled erase=disabled write pattern = disabled	set autoresume all enabled
BlockDevClean		blockdevclean 30
BlockDevIdentify		blockdevidentify Alpha
BlockDevIDStop		blockdevidstop
BlockDevScan		blockdevscan
BootFibreDelay	0	set bootfibredelay 15
BridgeModel		get bridgemodel
BridgeName	“ “	set bridgename Omega6
ClearEventLog		cleareventlog
Date		set date 03/03/2003
DefaultInterleave	128	set defaultinterleave 64
DeleteAllMaps		deleteallmaps
DHCPFixedDelay	0	set dhcpfixeddelay 15
DisplayEventLog		displayeventlog
DisplayEventLogFilter	all all all	set displayeventlogfilter gen info all
DriveTest		drivetest begin
DriveTestConfig		set drivetestconfig read
DriveTestList		set drivetestlist all

Command	Default	Example
DriveTestStatus		get driveteststatus
DumpConfiguration		dumpconfiguration
DumpEventLog		dumpeventlog
EmailFromAddress		set emailfromaddress notify1@attotech.com
EmailNotify	disabled	set emailnotify enabled
EmailNotifyAddress		get emailnotifyaddress
EmailPassword		set emailpassword alpha123
EmailServerAddress	0.0.0.0	get emailserveraddress
EmailUsername		get emailusername
EthernetSpeed	auto	set ethernetspeed 100
EventLog	enabled	set eventlog disabled
EventLogFilter	all all all	set eventlogfilter gen info none
Exit		exit
FCConnMode	loop	set fcconnmode all ptp
FCDataRate	auto	get fcdatarate
FCHard	disabled	set fchard disabled
FCHardAddress	fp1=3; fp2=4; fp3=5; fp4=6	set fchardaddress 1 122
FCMultiNode	disabled	set fcmultinode enabled
FCPortErrors		get fcporterrors all
FCPortList		fcportlist
FCTargets		fctargets
FCWWName		get fcwwname 1
FirmwareRestart		firmwarerestart
Help		help driveinfo
HSAdd		hsadd 3
HSDisplay		hsdisplay
HSRemove		hsremove 3
IdentifyBridge	disabled	set identifyBridge enabled
Info		info
IPAddress		get ipaddress mp1
IPDHCP	enabled	set ipdhcp mp1 disabled
IPGateway		get ipgateway mp1
IPSubnetMask		get ipsubnetmask mp1
IsReserved		isreserved
MaxOpTemp	70	get maxoptemp
Metrics		metrics display all
MinOpTemp	0	set minoptemp 10
OpTempWarn	5	set optempwarn 15
Partition		partition alpha1 6 4 GB
PartitionDisplay		partitiondisplay alpha1
PartitionMerge		partitionmerge all
PartitionSplit		partitionsplit alpha1 22 2
Password	Password	set password
Performance		get performance 2
Ping		ping mp1 192.42.155.155

Command	Default	Example
RAIDCommandTimeout	30000	set raidcommandtimeout 10000
RAIDRebuildPriority	same	set raidrebuildpriority low
Reserve		reserve
ResetFCPortErrors		resetfcporterrors 1
RestoreConfiguration		restoreconfiguration default
RGAddStorage		rgaddstorage g1 span commit
RGCancelAddStorage		rgcanceladdstorage g1
RGCommit		rgcommit all
RGCreate		rgcreate g1 raid0
RGDelete		rgdelete g1
RGDisplay		rgdisplay all
RGErase		rgerase g1
RGHaltConversion		rghaltconversion g1
RGHaltErase		rghalterase all
RGHaltRebuild		rghaltrebuild g1
RGHaltWritePattern		rghaltwritepattern g1
RGMemberAdd		rgmemberadd g1 22
RGMemberRemove		rgmemberremove g1 22
RGRebuild		rgrebuild g1
RGResumeConversion		rgresumeconversion g1
RGResumeErase		rgresumeerase all
RGResumeRebuild		rgresumerebuild g1
RGResumeWritePattern		rgresumewritepattern g1
RGSpanDepth	1	set rgspandepth g1 22
RGSpeedRead	disabled	set rgspeedread g1 enabled
RGUnmap		rgunmap g1
RGWaitTimeout	5	set rgwaittimeout 30
RGWritePattern		rgwritepattern g1 pattern
RMState		set rmstate g1 online
RMStatus		rmstatus g1
Route		route fc 1 0 raid alpha1 6 bridge
RouteDisplay		routedisplay fc
SaveConfiguration		saveconfiguration restart
SerialNumber		get serialnumber
SerialPortBaudRate	115200	set serialportbaudrate 19200
SerialPortEcho	enabled	get seriallportecho
SNTP	enabled	get sntp
SNTPServer	192.43.244.18	set sntpserver 129.6.15.28
TailEventLog		taileventlog
Temperature		get temperature
Time		set time 03:32:30
TimeZone	EST	set timezone pst
Username	root	set username Barbara
VerboseMode	enabled	set verbosemode disabled
VirtualDriveInfo		virtualdriveinfo

Command	Default	Example
Voltage		get voltage
WrapEventLog	enabled	set wrapeventlog disabled
zModem		zmodem receive

CLI command explanations

Command Line Interface commands are listed alphabetically with explanations of what they are used for, their defaults and syntax.

CAUTION

Using CLI without contacting an ATTO technician is not recommended because changing parameters may cause loss of data and/or disruption to performance and reliability of the FastStream.
The ExpressNAV interface is the preferred method to operate and manage the FastStream SC 5700. Refer to Interface options on page 29 for details.

AutoMap

Automap automatically maps a subset of target devices visible to the firmware. All previous maps are deleted.

AutoMap

AutoResume

Enables/disables the automatic continue feature for interrupted rebuild, erase and write pattern operations at startup. If AutoResume is enabled, all interrupted rebuild, erase and write pattern operations are continued at startup. Optional parameter GroupName specifies the RAID group whose restart features are to be set. If no GroupName is specified, all existing RAID groups are affected.

set AutoResume [Rebuild | Erase | WritePattern | all]
[enabled | disabled] <GroupName>

BlockDevClean

Removes any ATTO configuration data from the block device with the specified BlockDevID. BlockDevID is the index of a block device provided by the ***BlockDevScan*** *CLI command.*

BlockDevClean [BlockDevID]

BlockDevIdentify

Causes the I/O LED of the drive to illuminate for one minute if it is accessible through the FC port

CAUTION

The BlockDevIdentify command is intended for diagnostic purposes only. Executing this command may adversely impact the performance and throughput of the FastStream for the time that the LED is illuminated.

BlockDevIdentify <Groupname> [BlockDevID |
MemberIndex]

BlockDevIDStop

Turns off the IO LED of a previously identified disk drive.

BlockDevIDStop

BlockDevScan

Lists all currently connected physical drives along with any potential RAID group association. Each block device listed is assigned a unique index at the time of the scan to identify drives for other CLI operations.

BlockDevScan

BootFibreDelay

Regulates the delay (in seconds) which the unit waits after startup before enabling the Fibre Channel ports. The value "0" constitutes no delay.

set BootFibreDelay [0 | 15 | 30 | 45 | 60 | 75]
get BootFibreDelay

BridgeModel

Reports model information about the FastStream.

get BridgeModel

BridgeName

Specifies a name assigned to the FastStream to identify individual FastStream units. It is not the World Wide Name. The string is alphanumeric, up to eight characters long,.

Default: ""
set BridgeName [name]
get BridgeName

ClearEventLog

Clears the contents of the event log. No new entries are recorded until ClearEventLog has completed.

ClearEventLog

Date

Regulates the current date for this unit. The date range is 1/1/2000 to 12/31/2099.

set Date [MM] [DD] [YYYY]
get Date

DefaultInterleave

Assigns or retrieves the system-default interleave size for new RAID groups where the interleave size is expressed as the number of 512-byte blocks. If an interleave size is not explicitly specified when a RAID group is created, then the ***DefaultInterleave*** *value is used instead.*

Default: 128
set DefaultInterleave [16 | 32 | 64 | 128 | 256]
get DefaultInterleave

DeleteAllMaps

Removes all mapped devices from the map table. Upon the subsequent POST, if no maps are present the default maps are loaded.

DeleteAllMaps

DHCPFixedDelay

Selects/displays the delay, in seconds, between DHCP client request intervals, from between 0 seconds to 255 seconds. 0 time is typical.

Default: 0 (no delay)
set DHCPFixedDelay [0 - 255]
get DHCPFixedDelay

DisplayEventLog

Displays the event log.The event log may be filtered using the ***DisplayEventLogFilter*** *command. The optional parameter* ***n*** *is the number of lines to be displayed as a single page with no user interaction. After the command has executed, use +, - or = to scroll through the log. Press* ***q*** *to exit the command.*

DisplayEventLog <n>

DisplayEventLogFilter

Filters the display of data for specified subsystems and levels during ***DisplayEventLog*** *mode. Valid event log subsystem entries are platform-dependent. For set commands, the final parameter indicates whether or not events from the specified subsystem and level are displayed.*

Subsystem	Levels
ECC	INFO
ENET	WARN
GEN	CRIT
HTTP	FAIL
NVRAM	ALL
PERF	
SCSI	
NDMP	
FC	
ALL	

Default: all all all
set DisplayEventLogFilter [subsystem | all] [level | all] [all | none]
get DisplayEventLogFilter [subsystem | all] [level | all] [all | none]

DriveTest

Immediate command which starts or stops a drive test with the previously specified configuration and drive list. Drives which are in-use by the test are not available for RAID configuration or RAID operations. Only one test can be run at a time.

DriveTest [Begin | Cancel]

DriveTestConfig

Configures the next drive test to perform one of the following operations: initialize (destructive write-only), read (non-destructive read-only), verify (destructive verify), or init-verify (destructive write-read-verify).The test is not started until the ***DriveTest Begin*** *command is given.*

Default: not initiated
set DriveTestConfig [init | read | verify | init-verify]
get DriveTestConfig

DriveTestList

Specifies drives to be run in the next drive test. including drives which are not part of a RAID group and not Hot Spares. The ***all*** *parameter automatically chooses eligible drives. The test is not started until the DriveTest Begin command is given.*

set DriveTestList [drive [BlockDevID] | all]
get DriveTestList

DumpConfiguration

Displays a unit's configuration.

DumpConfiguration

DumpEventLog

Dumps the contents of the entire event log to the current CLI session without impact on the log itself (the log is not cleared). No events are recorded until the command has been completed.

DumpEventLog

EmailFromAddress

Configures the E-mail address that the FastStream uses to talk to the E-mail server. Full E-mail address is a fully qualified Internet E-mail address, not more than 128 characters.

set EmailFromAddress [full email address]
get EmailFromAddress

EmailNotify

Regulates E-mail notification.

Default: disabled.
set EmailNotify [enabled | disabled]
Requires a SaveConfiguration command
get EmailNotify

EmailNotifyAddress

Configures notification addresses using an index (a number between 1 and 5, inclusive), the full E-mail address of the recipient, a fully qualified Internet E-mail address not more than 128 characters long, and a level.

Levels are
- None: no E-mails sent.
- Critical: critical event notification.
- Warning: warnings and critical event notification.
- All: all warnings, critical events

set EmailNotifyAddress [index] [full email address] [warning level]
get EMailNotifyAddress <index | all>

EmailPassword

Configures the password used to authenticate the login to the SMTP email server. The password must not be more than 64 characters. A password is not required if the email server does not require authentication.

set EmailPassword [password]

EmailServerAddress

Configures the address of the server that the FastStream should contact in order to send E-mails.

Default: 0.0.0.0
set EmailServerAddress [IP address]
get EmailServerAddress

EmailUsername

Configures the user name used to authenticate the login to the SMTP email server. The user name must not be more than 128 characters. A user name is not required if the email server does not require authentication.

set EmailUsername [Username]
get EmailUsername

EthernetSpeed

Sets/displays the current speed of the Ethernet

connection. Choices are **10, 100**, and **Auto**.
Default: auto
set EthernetSpeed [mp1] [10 | 100 | Auto]
Requires a SaveConfiguration command
get EthernetSpeed [mp1]

EventLog

Regulates event logging. When enabled, the unit records various system events to the event log.

Default: enabled
set EventLog [enabled | disabled]
get EventLog

EventLogFilter

Filters data from specific unit subsystems and levels when event logging is enabled. The specific entries supported are platform-dependent. For set commands, the final parameter indicates whether or not events from the specified subsystem and level are displayed.

Subsystem	Levels
ECC	INFO
ENET	WARN
GEN	CRIT
HTTP	FAIL
NVRAM	ALL
PERF	
SCSI	
NDMP	
FC	
ALL	

set EventLogFilter [subsys | all] [event level | all] [all | none]
get EventLogFilter [subsystem] [level]

Exit
Exits the current Ethernet telnet CLI session; it has no effect if used during a serial or in-band CLI session.

Exit

FCConnMode
*Controls/reports the connection mode the FastStream uses when communication across a FC network, either to an Fibre Channel Arbitrated Loop (FC-AL) when you select **loop** mode, or point-to-point when you choose **ptp**. If you choose **loop-ptp** or **ptp-loop**, the FastStream tries to use the first parameter first.*

Default: loop
set FCConnMode [fp | all] [loop | ptp | loop-ptp | ptp-loop]
Requires a SaveConfiguration command
get FCConnMode [fp | all]

FCDataRate
Specifies the Fibre Channel rate the FastStream uses, 1 Gigabit/sec., 2 Gigabit/sec. 4 Gigabit/sec. or auto negotiate.

Default: auto
set FCDataRate [fp| all] [1Gb | 2Gb | 4Gb | auto]
Requires a SaveConfiguration command
get FCDataRate [fp | all]

FCHard
*Used to enable or disable FC hard address assignment. Under soft addressing, the FastStream loop address is assigned during loop initialization.If you enable hard addressing use **FCHardAddress** (described below).*

Default: disabled
set FCHard [enabled | disabled]
Requires a SaveConfiguration command
get FCHard

FCHardAddress
Sets/displays the value used as the FC-AL hard address. This hexadecimal value represents the address the FastStream tries to use if hard addressing is enabled. When an address is not set, the current value is displayed. The valid range of values is 0 through 125.

Default fp1=3; fp2=4fp; fp3=5; fp4=6
set FCHard Address [fp | all] [address]
Requires a SaveConfiguration command
get FCHardAddress [fp | all]

FCMultiNode
When enabled (multi node), each port reports a separate unique Node Name and logical units may be mapped to either port. When disabled (single node), each port reports the same Node Name and each logical unit mapping is applied to all ports.

set FCMultiNode [enabled | disabled]
get FCMultiNode

FCPortErrors
Displays the number of Fibre Channel errors that have occurred since the last reboot/power-on or ResetFCPortErrors.

get FCPortErrors [fp | all]

FCPortList
Returns a list of available FC ports and their current status. Valid status values are Up, Down, Failed, Reserved and Disabled.

FCPortList

FCPortRecover
Controls the behavior of Fibre Channel ports while the unit is operating in port failover mode. The unit tries to restore the pre-failover state after a failover condition.

FCPortRecover

FCTargets
Lists all target devices available on the Fibre Channel port with the index specified by <fp>. If no port index is specified, then all target devices on all Fibre ports is displayed. A port-unique index is assigned to each target which is used with the fp to specify a Fibre Channel target for a subsequent Route CLI command.

FCTargets <fp>

FCWWName
Reports the Word Wide Name (WWN) of the FC interface. Each FC port has an individual and unique WWN. The least significant 3 bytes of the WWN are used as the Ethernet MAC address. The lower nibble of the highest byte designates the port number.

get FCWWN [fp | all]

FirmwareRestart
*Resets and reinitializes the unit firmware. Use the **forced** option to override any CLI reservations held by other sessions.*

FirmwareRestart <forced>

Help
Displays a list of available commands. If command name is specified, displays detailed command-specific information.

Help <command name>

HSAdd
Assigns a Block Device to the Hot Spare pool.

HSAdd [BlockDevID]

HSDisplay
Lists all devices in the Hot Spare pool.

HSDisplay

HSRemove
Removes a Block Device from the Hot Spare pool

HSRemove [BlockDevID]

IdentifyBridge
Enabling this option causes the front panel Ready LED of the FastStream to blink until the parameter is disabled.

Default: disabled
set IdentifyBridge [enabled | disabled]
get IdentifyBridge

Info
Displays version numbers and other production information for key components.

Info

IPAddress
Regulates the current FastStream IP address.If IPDHCP is enabled (see below), get command reports current IP address assigned by DHCP server. Setting this value always modifies the internal NVRAM value of the IP Address, whether or not a ***SaveConfiguration*** *is performed.*

set IPAddress [mp1] xxx.xxx.xxx.xxx
get IPAddress [mp1]

IPDHCP
Selecting DHCP allows the FastStream to request an IP address from the network. The network must have at least one DHCP server.

Default: enabled
set IPDHCP [mp1] [enabled | disabled]
Requires a SaveConfiguration command
get IPDHCP [mp1]

IPGateway
Controls the current default gateways used by any Ethernet port(s) on the unit. If IPDHCPis enabled, the 'get' command reports the current IP gateway assigned by the network DHCP server.

set IPGateway [mp1] [xxx.xxx.xxx.xxx]
get IPGateway [mp1]

IPSubnetMask
Sets/displays the current subnet mask. If IPDHCP is enabled (see above), get command reports current subnet mask assigned by DHCP server. Setting this value always modifies the internal NVRAM value of the IP subnet mask whether or not a ***SaveConfiguration*** *is performed.*

set IPSubnetMask xxx.xxx.xxx.xxx
get IPSubnetMask

IsReserved
Displays the reservation status of the current unit.

IsReserved

MaxOpTemp
Regulates the maximum operating temperature of this unit in degrees Celsius. Valid entries are between 55 and 70 degrees.

Default: 70
set MaxOpTemp [55 – 70]
get MaxOpTemp

Metrics
Controls the collection of standard data metrics within a product via the command's Start, Stop and Display parameters.

Metrics [Start | Stop | Display] [drive [BlockDevID] | all | running]

MinOpTemp
Regulates the minimum operating temperature of this unit in degrees Celsius. Valid entries are between 0 and 15 degrees.

Default: 0
set MinOpTemp [0 – 15]
get MinOpTemp

OpTempWarn
Regulates the number of degrees Celsius before a thermal control event precipitates a warning to the user. Valid entries are between 0 and 15 degrees.

Default: 0
set OpTempWarn [0 – 15]
get OpTempWarn

Partition

Sets the specified partition to the specified capacity in gigabytes (GB), megabytes (MB), or blocks. The specified capacity must be smaller than the specified partition's current capacity. A new partition is created to acquire the remainder of the original partition's space. VirtualDriveInfo displays characteristics and statistics for all the available virtual drives or any available virtual drive identified by its virtual drive ID.

Partition [GroupName] [PartIndex] [capacity] [GB | MB | blocks]

PartitionDisplay

Lists all the partitions available in the specified RAID Group. The partitions are listed in order of contiguousness (as opposed to index order). GroupName is the ASCII name of the RAID Group for which partitions are displayed.

PartitionDisplay [GroupName]

PartitionMerge

Combines the specified contiguous partitions into one partition. GroupName is the ASCII name of the RAID Group containing the partitions to merge. PartIndex is the index of a partition to merge, along with a number of contiguous partitions to merge to that index. 'All' indicates that all partitions in the RAID Group are merged into a single Virtual Disk. The RAID Group must not be in a NEW state. None of the partitions to merge may be mapped.

PartitionMerge [GroupName] [[[PartIndex] [2-128]] | All]

PartitionSplit

Divides the specified partition into one or more partitions whose capacities are evenly distributed among the capacity of the original partition. GroupName is the ASCII name of the RAID Group containing the partition to split. PartIndex is the index of the partition to split. The partition to split cannot be mapped. The RAID Group must not be in a NEW state.

PartitionSplit [GroupName] [PartIndex] [1-128]

Password

Specifies password for all non-serial sessions: Telnet, ftp and FastStream browser-based user interface. You are prompted for the current password, to type the new password, and to confirm the new password. If local ***echo*** *is enabled, password echoes all * characters. In verbose mode only, CLI requests the password be re-typed. When the password is all* ***0****s, Telnet and ftp do not validate the password and MD5 authentication is disabled. Passwords are case sensitive and can be 1-32 characters long with no spaces.*

Default: Password
set Password
Requires a SaveConfiguration command

Performance

Returns the performance data for the FC port you specify. Data includes the average rate (MB per sec.) and number of I/Os measured over the previous sampling period where a sampling period is approximately one second. Successful Read (08h, 28h) and Write (Oah, 2Ah) commands are considered I/Os.Reported performance may be affected by FC port availability and saturation and overall system use.

get Performance <fp>

Ping

Sends an ICMP echo request to the specified host.

ping [mp1] [xxx.xxx.xxx.xxx] <count <size>>

RAIDCommandTimeout

Specifies in milliseconds the range of time the drives have to respond. You must have created a RAID group to use this command.

CAUTION

If you set this value too low, failures may occur during normal operation.

Default: 30000
set RAIDCommandTimeout [100 - 3600000]
Requires a SaveConfiguration command
get RAIDCommandTimeout

RAIDRebuildPriority

*Sets or displays the RAID rebuild priority. A RAID rebuild priority set to **high** gives higher priority to RAID rebuilds and lower priority to the processing of simultaneous I/O transactions. A RAID rebuild priority set to **low** gives lower priority to the rebuild and a higher priority to I/O transactions. Set **same,** the RAID rebuild and processing of I/O transactions is the same.*

Default: same

set RAIDRebuildPriority [high | low | same]
get RAIDRebuildPriority

Reserve

Reports the state of CLI reservation for the current CLI session. If the command reports that Reservations are enabled, then another CLI session has control of parameter modification on the unit.

Reserve

ResetFCPortErrors

ResetFCPortErrors resets all Fibre Channel error counts for the specified port to zero. See FCPortErrors.

ResetFCPortErrors [fp | all]

RestoreConfiguration

*Issued with the **default** option, forces the unit NVRAM settings to their original defaults. The **saved** option undoes any changes made to this session since the last save.*

RestoreConfiguration [Default | Saved]

RGAddStorage

*Adds additional storage to an existing RAID group. **Mirror**|**Stripe**|**Span** specifies the method used to expand the storage. Optional parameter BlockDeviceID specifies available block device(s) to be added to the RAID group. Optional parameter **commit** specifies that the **RGCommit** command is run automatically.*

Note

Mirrors cannot be added to a RAID 5 group.

RGAddStorage [GroupName] [Mirror | Stripe | Span]
<BlockDeviceID> <commit>

RGCancelAddStorage

*Cancels the **RGAddStorage** command.*

RGCancelAddStorage [GroupName]

RGCommit

Stamps a NEW RAID Group's configuration to its member drives. After this command, a RAID Group can be considered operational and transition from the NEW state to the ONLINE, DEGRADED, or OFFLINE state depending on the health of the selected member drives. RGCommit also stamps an EXISTING RAID Group's configuration to its member drives, when the EXISTING RAID Group is in the process of having storage added. GroupName is the ASCII name of the NEW RAID Group to commit. If the init option is specified, previous user configuration information is erased from each new member drive.

RGCommit [GroupName | all] <init>

RGCreate

Creates a NEW empty RAID group. The optional value after the RAID group parameter represents the desired interleave for the RAID group, where the desired interleave is expressed in the number of 512-byte blocks. If this value is not provided then the system-default interleave size is used.

RGCreate [GroupName] [RAID[0 |1|10| 5] |JBOD] <16 |
32 | 64 |128 | 256 >

RGDelete

*Deletes the specified RAID group. If **All** is used, the command deletes all existing RAID groups that do not have mapped Virtual drives. Any commands outstanding to the RAID group when this command is issued are completed before deleting the RAID group. A successful delete clears the configuration area of the member drives. This command fails if the specified RAID group does not exist. You are asked to confirm the delete if you have enabled verbose mode.*

RGDelete [GroupName | All]

RGDisplay

*Displays status information for a single RAID group, or if **All** is used, all available RAID groups.*

RGDisplay [GroupName | All]

RGErase

Erases the data from the specified existing RAID Group.

WARNING

If you use the RGErase command, all data is lost.

RGErase [GroupName]

RGHaltConversion
Stops the conversion on the specified existing RAID group.
RGHaltConversion [GroupName]

RGHaltErase
Stops the erase on the specified existing RAID Group.
RGHaltErase [GroupName]

RGHaltRebuild
Stops the rebuild(s) on the specified existing RAID group. MemberIndex specifies the RAID member whose rebuild is stopped. If no MemberIndex is specified, all rebuilds on that RAID group are stopped.
RGHaltRebuild [GroupName] <MemberIndex>

RGHaltWritePattern
Stops the write pattern on the specified existing RAID Group.
RGHaltWritePattern [GroupName]

RGMemberAdd
Adds an available block device to a NEW RAID group. This command fails if the specified RAID group does not exist, if the specified RAID group is not in the NEW state, or if the specified block device index does not represent an available device. The RAID group cannot have been saved using the ***RGCommit*** *command.*
RGMemberAdd [GroupName] [all | BlockDevID]

RGMemberRemove
Removes a RAID member from a NEW RAID group. This command fails if the specified RAID group does not exist, if the specified RAID group is not in the NEW state, or if the specified block device index does not represent an available device. The RAID group cannot have been saved using the ***RGCommit*** *command. Resets the number of partitions to one.*
RGMemberRemove [GroupName] [MemberIndex]

RGRebuild
Starts rebuilding the specified existing RAID group. Optional parameter MemberIndex specifies the member to rebuild. If no member is specified, all degraded members are rebuilt. Optional parameter BlockDeviceID allows an available block device to be substituted for the RAID Member currently assigned to the MemberIndex.
RGRebuild [GroupName] <MemberIndex>
<BlockDeviceID>

RGResumeConversion
Continues the stopped conversion on the specified existing RAID group.
RGResumeConversion [GroupName]

RGResumeErase
Continues the erase on the specified existing RAID Group.
RGResumeErase [GroupName]

RGResumeRebuild
Continues the rebuild(s) on the specified existing RAID group. MemberIndex specifies the RAID member whose stopped rebuild is continued. If no MemberIndex is specified, all stopped rebuilds on that RAID group are continued.
RGResumeRebuild [GroupName] <MemberIndex>

RGResumeWritePattern
Continues the write pattern on the specified existing RAID Group.
RGResumeWritePattern [GroupName]

RGSpanDepth
Sets the span depth on the specified existing RAID group. The RAID group must be RAID Level 0, RAID Level 1, RAID Level 5, or RAID Level 10.
set RGSpanDepth [GroupName] [SpanDepth [1-32]]
get RGSpanDepth [GroupName]

RGSpeedRead
Performs look-ahead during reads from RAID group member disks for ***ALL*** *or the specified RAID group. This command fails if the RAID group does not exist. GroupName is the ASCII name of the RAID group for which look-ahead reads are performed.*
Default: disabled
set RGSpeedRead [GroupName | all] [enabled | disabled]
get RGSpeedRead [GroupName | all]

RGUnmap
Removes all mapped partitions for a RAID group from the routing table. The partitions themselves are unaffected, but they are inaccessible to initiators. This command fails if the RAID Group does not exist, or if it does not have any mapped partitions.
RGUnmap [GroupName | all]

RGWaitTimeout

*Specifies the maximum time in seconds that the system waits to discover previously-configured RAID groups attached to the FastStream. The timeout is used during system boot time and when the **BlockDevScan** command is issued.*

Default: 5
set RGWaitTimeout [1-3600]
get RGWaitTimeout

RGWritePattern

Writes a DWORD pattern of four hexadecimal bytes to the entire specified existing RAID Group.

WARNING

If you use the RGWritePattern command, the RAID Group is set to offline and all data is lost.

RGWritePattern [GroupName] [Pattern]

RMState

Sets the member state on the specified existing RAID group member(s). RAID group may not be in the NEW state. Optional parameter MemberIndex specifies the RAID Member whose status is to be set. If no MemberIndex is specified, the status of all members of the specified RAID group is set.

Note

Members undergoing rebuild are not changed. Rebuilds on these members must first be stopped.

set RMState [GroupName] <MemberIndex> [Online | Degraded | Unavailable | Faulted]

RMStatus

Displays the status of all RAID Members within the specified RAID group or a specific RAID member (if specified) within the specified RAID group. This command fails if the specified RAID group does not exist or a specified member index within the RAID group does not exist.

RMStatus [GroupName] <MemberIndex>

Route

Assigns a host protocol address to a target destination device. More than one FC LUN may be assigned to a partition. If you try to map a new partition to the same FCLUN, the previous map is overwritten. Use the delete identifier to remove the map. In verbose mode, secondary confirmation must be made.

FCMultiNode disabled: Route FC [fl] [RAID [GroupName] [PartIndex]] | Bridge | Delete]
FCMultiNode enabled: Route FC [fp] [fl] [RAID [GroupName] [PartIndex]] | Bridge | Delete]

RouteDisplay

Displays a list of Fibre Channel to address mappings on the FastStream.

FCMultiNode disabled: RouteDisplay FC <fl>
FCMultiNode enabled: RouteDisplay FC <fp> <fl>

SaveConfiguration

*Issued with the restart option, cycles unit power after saving configuration changes. The **norestart** option saves changes without restarting.*

Note

Certain modifications require a system restart.

SaveConfiguration <Restart | NoRestart>

SerialNumber

Reports the FastStream serial number which is unique for each FastStream. The serial number tracks the board throughout its life and should not be changed.

get SerialNumber

SerialPortBaudRate

*Configures the baud rate for the unit's RS-232 serial port. The number of data bits is fixed at **8** with no parity.*

set SerialPortBaudRate [2400 | 9600 | 19200 | 38400 | 57600 | 115200]
get SerialPortBaudRate

SerialPortEcho

Controls if the unit echoes characters on its RS-232 port. When enabled, all non-control character keyboard input is output to the display.

Default: enabled
set SerialPortEcho [enabled | disabled]
get SerialPortEcho

SNTP
Controls whether SNTP time server is used.

Default: enabled
set SNTP [enabled | disabled]
get SNTP

SNTPServer
Controls or displays the main IP address the client uses to retrieve the SNTP time.

Default: 192.43.244.18
set SNTPServer[xxx.xxx.xxx.xxx]
get SNTPServer

TailEventLog
*Displays new events to the terminal. Type **q** and press **Enter** to exit tail mode.*

TailEventLog

Temperature
Displays the current internal operating temperature of this unit in degrees Celsius.

get Temperature

Time
Controls or displays the current time as clocked by the unit in 24 hour format. Time cannot be set while SNTP is enabled.

set Time [HH: MM: SS]
get Time

TimeZone
Controls or displays the time zone or an offset from GMT for the unit.

set TimeZone [[EST | CST | MST | PST] | [+/-HH:MM]]
get TimeZone

Username
*Specifies the user name used for all sessions: NDMP, Telnet, FTP and Webserver. **Username** is case insensitive, 1 to 32 characters, and cannot contain spaces.*

Default: root
set Username [username]
get Username

VerboseMode
*Controls the level of detail in CLI **Help** output and command response output for the current CLI session.*

Default: enabled
set VerboseMode [enabled | disabled]
get VerboseMode

VirtualDriveInfo
Displays characteristics and statistics for all the available virtual drives or any available virtual drive identified by its virtual drive ID.

VirtualDriveInfo <VirtualDrive ID>

Voltage
Displays the current voltage level as monitored by the FastStream.

Representations of the voltages are
VDDA: +3.31 V
VDDB: +2.49 V
VDDC: +1.5V
VDDD: +1.35V
ALL: all monitored voltages
get Voltage <VDDA |VDDB |VDDC VDDD | all>

WrapEventLog
When enabled, the FastStream logs up to 2,048 event entries before wrapping (overwriting the first entries). If disabled, the FastStream stops logging event entries when the buffer is full.

Default: enabled
set WrapEventLog [enabled | disabled]
get WrapEventLog

zModem
*Uses the zMODEM protocol to transfer a file to or from the unit via the RS-232 port. The filename to retrieve is required if the **send** option is specified.*

Zmodem [send [filename] | receive]

Appendix C Standards and compliances

The equipment described in this manual generates and uses radio frequency energy. If this equipment is not used in strict accordance with the manufacturer's instruction, it can and may cause interference with radio and television reception. See the ATTO FastStream SC 5700 Technical Specification sheet for your particular model for a full list of certifications for that model.

FCC Standards: Radio and Television Interference

WARNING

This **equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to the FCC rules Title 47 of the CFR, Part 15, Subpart B which are designed to provide a reasonable protection against such interference when operating in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.**

If this equipment does cause interference to radio and television reception, which can be determined by turning the equipment off and on, try to correct the interference by one or more of the following measures:

- Move the receiving antenna.
- Relocate the FastStream SC 5700 with respect to the receiver, or move the FastStream SC 5700 away from the receiver.
- Plug the computer into a different outlet so the computer and receiver are on different branch circuits.
- If necessary, consult an ATTO authorized dealer, ATTO Technical Support Staff, or an experienced radio/television technician for additional suggestions.

The booklet *How to Identify and Resolve Radio/TV Interference Problems* prepared by the Federal Communications Commission is a helpful guide. It is available from the US Government printing office, Washington, DC 20402, Stock No. 004-000-00345-4.

Further results of FCC Testing

In certain instances, extraordinary variances in the AC power supplied to this unit will require the operating system's normal error recovery procedure to retry the current command. In this case, the unit can fully recover with no loss of data, and without user intervention. Note that other exceptional conditions in addition to variances in the AC power, such as improper cabling or unrecognized commands, may also trigger these normal error recovery procedures.

MET

Listed with MET UL 60950-1/CSA C22.2 No. 60950-1.

Canadian Standards

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

European Standards

Declaration of Conformity

This following statement applies to the ATTO FastStream SC 5700.

This device has been tested in the basic operating configuration and found to be compliant with the following European Union standards:

Application of Council Directive: 89/336/EEC

Standard(s) to which conformity is declared: EN55022, (CISPR 22) / EN55024 (CISPR24) / IEC EN 60950-1

This Declaration will only be valid when this product is used in conjunction with other CE approved devices and when the entire system is tested to the applicable CE standards and found to be compliant.

The ATTO FastStream SC 5700 complies with Directive 2002/95/EC on the Restriction of the Use of Hazardous Substances in Electrical and Electronic Equipment (RoHS).

Appendix D Warranty, contact information

Manufacturer limited warranty

Manufacturer warrants to the original purchaser of this product that it is free from defects in material and workmanship as described in the ATTO Technology website, **www.attotech.com**. Manufacturer liability shall be limited to replacing or repairing, at its option, any defective product. There is no charge for parts or labor should Manufacturer determine that this product is defective.

Products which have been subject to abuse, misuse, alteration, neglected, or have been serviced, repaired or installed by unauthorized personnel shall not be covered under this warranty provision. Damage resulting from incorrect connection or an inappropriate application of this product shall not be the responsibility of Manufacturer. Manufacturer's liability is limited to Manufacturer's product(s); damage to other equipment connected to Manufacturer's product(s) is the customer's responsibility.

This warranty is made in lieu of any other warranty, express or implied. Manufacturer disclaims any implied warranties of merchantability or fitness for a particular purpose. Manufacturer's responsibility to repair or replace a defective product is the sole and exclusive remedy provided to the customer for breech of this warranty. Manufacturer is not liable for any indirect, special, incidental, or consequential damages irrespective of whether Manufacturer has advance notice of the possibility of such damages. No Manufacturer dealer, agent or employee is authorized to make any modification, extension or addition to this warranty.

Contact ATTO Technology, Inc.

Customer service, sales and technical support are available by phone Monday through Friday, 8 a.m. to 5 p.m EST., or by fax and website 24-hours a day.

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